SANITARY SEWER SYSTEM FOR GLEN ELLYN, ILLINOIS.

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ARMOUR INSTITUTE OF TECHNOLOGY

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Design of a sanitary sewer
system for the town of Glen

DESIGN OF

A

SANITARY SEWER SYSTEM

FOR THE

TOWN OF GLEN ELLYN

ILLINOIS.

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TO THE

PRESIDENT AND FACULTY

OF

ARMOUR INSTITUTE OF TECHNOLOGY

FOR THE DEGREE OF

BACHELOR OF SCIENCE

IN

CIVIL ENGINEERING

HAVING COMPLETED THE PRESCRIBED COURSE IN CIVIL ENGINEERING

L. C. Monin
Head of the Dept. of Civ. Eng.

Alfred E. Phillips
Prof. of Civil Engineering

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Dean of Eng. Studies

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We wish to express our obligations to Messrs.P.E.Green and W.W.Marr of the Aetna Engineering Bureau and to Prof.A.E.Phillips for such data and information as was needed for the completion of this Thesis.

INTRODUCTION.

Glen Ellyn is about twenty-five miles west of Chicago on the Chicago and Northwestern Ry. and the Aurora, Elgin and Chicago Ry. It is a residence city having a population, at the present time, of approximately two thousand. Being a progressive town, its residents realized the necessity of installing a sewer system. The Aetna Engineering Bureau of Chicago was retained to draw up the plans and specifications.

Messrs. Green and Marr kindly gave us the level notes and other information which enabled us to design the appended system.

The sewage is discharged into the Du Page River at a point southeast of the town proper. We had intended designing a purification plant but through lack of time we were obliged to abandon this design.

METHOD OF PROCEDURE.

Having obtained the necessary information, the method of procedure decided upon was as follows:-

A. Preliminary Data-

Surveys- Map of town; levels of streets.

B. The Design-

1. Profiles of streets requiring sewers.
2. Velocity and discharge- Size of sewers.
3. Manholes.

C. Specifications, Contract, and Estimate of Cost.

1. Engineering and Supervision.
2. Construction of sewers.
3. Estimate.

A. A map of the town and the levels were obtained from Messrs. Green and Marr; we were thus spared much work and expense. The contour intervals of ten feet were taken from a U.S.G.S. map.

B. The profiles were plotted to a scale of- vertically, 1" = 4'; horizontally, 1" = 100'. Sewers were designed for streets which would serve the greatest number of inhabitants.

Allowing a maximum of 100 gallons of sewage per capita per day, assuming the discharge to take place in 10 hours, and assigning 20 people to the acre, the discharge (in cu. ft. per min.) through a sewer was calculated from the formula:

$Q = \frac{125xDA}{7.48xT}$ or $Q = \frac{125x20xA}{7.48x10x60}$ = 0.557A, where "A" is the number of acres contributing to the sewer.

The volume of the furthermost lateral sewer was first calculated; where this joined another, the contributions of both were added to determine the flow below that point, and in tracing down this line as each branch was encountered its contribution was calculated and added.

With the discharge and grade known, the velocity of flow and size of sewer were obtained by consulting Table No.10 in Folwell's "Sewerage".

Manholes were placed at street intersections and at changes of grades. Drop manholes were necessary at several places. The sewers are intended to be flushed by means of hoses; hence no flush tanks were designed.

SPECIFICATIONS

AND

FORMS

Instructions to Bidders.

It is the intension of these specifications to provide for this improvement in a complete, thorough and workmanlike manner. The contractor to whom the work is awarded shall furnish all materials, labor and all appurtenances necessary to complete the work in accordance with these specifications and anything omitted herein that may be reasonably interpreted as necessary to such completion is to be merged in the price bid for the improvement.

No bid will be acepted which does not contain an adequate or reasonable price for each and every item named in the schedule of quantities.

Bidders must satisfy themselves by personal examination of the location of the proposed work, and by such other means as they prefer as to the accuracy of the estimate of quantities.

Bidders must present satisfactory evidence to the Engineer and Board of Local Improvements that they have been regularly engaged in the business of building sewers or are reasonably familiar therewith, and that they are fully prepared with the necessary capital, machinery and materials to do the proposed work. No bid will be accepted from any person or firm who may be in arrears to the Village of Glen Ellyn upon debt or contract, or who shall

in default as surety or otherwise upon any obligation to said village or behind specified time on any previous work. Companies or firms bidding for the work herein described must state in the proposal the individual names and places of residence of the persons comprising said company or firm. The Board of Local Improvements reserves the right to reject any or all bidds or to accept bids separately in the aggregate.

All bids shall be made on forms provided for that purpose, and contractors are specially warned not to put in alternative propositions changing some part of the specifications, for such proposition will not be considered.

The plans and drawings showing location and dimensions of work to be constructed, prepared by the engineer, and on file in his office and the office of the Board, with all notes, dimensions figures and corrections thereon, shall be considered a part of these specifications, and in event of any discrepancy between plans and specifications, the judgment of the engineer shall be decisive thereon.

All papers submitted to bidders, except only those of the successful bidder, are to be returned to the engineer upon demand.

In order to afford the engineer ample opportunity for inspection, all material must be at the location where it is to be used at least three days before it is used.

Bidder are specially cautioned that the grading of the stone, sewer pipes, bricks and all other material used in

this work must agree closely with the approved [illegible] and that the inspection of such material will be rigid.

Nature of the Work.

The contractor shall, for the contract price per lineal foot for the sewer proper, or per unit bid on, furnish all tools and do all the work prescribed in these specifications and shown on the plans attached, including foundation and all necessary work and material for building of outfall, shall make the requisite excavation for building the sewer, and its appertaining structures and connections, shall do all the ditching, diking, pumping, bailing and draining, all sheeting and shoring; shall make all provisions necessary to maintain and protect all buildings, walls, fences, trees, gas pipe, conduits, sewers and other structures of whatever nature; shall provide all bridges, fences or other means of maintaining travel on intersecting streets, and on streets or roads in which the trenches are excavated; shall maintain the same in good and safe condition so long as may be necessary and then shall remove such temporary expedients and restore such ways to their proper condition; shall provide watchmen, fences, red lights and other precautionary measures necessary for protection of person and property; shall provide all centers and forms; shall construct all foundations, all brick, tile pipe, concrete, stone and timber work; shall refill trenches; and shall put in complete working order the sewers awarded him, and shall do all to the satisfaction

of the organizer. The contract price is to include the cost of the removal of trees, roots, timber or masonry structures or other obstacles, and the delay or damage occasioned by same, whether any of these obstacles are shown on the plans or not.

Proposal.

For Furnishing Materials And Constructing Sanitary Sewers in Glen Ellyn, Illinois.

Made by_____

Residing in _____

To the Board of Local Improvements, Glen Ellyn, Illinois

_____do hereby declare that_____ the only person_____interested in this proposal, and that no other person has any interest in this proposal, or in the contract proposed to be taken; that it is made without any connection with any other person, or persons or firms making proposals for the same work, and is in all respects without collusion or fraud. And_____ do further declare_____have carefully examined the grounds on which the sewers are to be constructed,_____ ____specifications and form of contract, and that _____ will contract to furnish all materials, tools and labor required to perform and complete the work referred to in the Notice to Contractors, and more particularly described in the specifications, in the manner and on the conditions therein set forth, and in accordance with the further drawings, instructions and explanations to be given by the engineer explanatory thereof, upon the following prices, to-wit:

8 inch standard strength vitrified sewer pipe_____

10 " " " " " " _____

12 inch standard strength vitrified sewer pipe._____

15 " " " " " " _____

18 " " " " " " _____

24 inch brick sewer,one ring._____

27 " " " two rings._____

30 " " " " " _____

For costructing each plain manhole complete,including all extra excavation and materials._____

For costructing each manhole with drop complete,including all extra excavation and materials._____

The above prices are to be for the work complete,and are also to include the cost of doing all other work required by the plans or specifications,or appertaining thereto.

Dated_____19_

Signer_____

ARTICLE [illegible] CONTRACT.

BETWEEN THE TOWN OF _____ party of the first part, and _____ Contractor, party of the second part, for building a System of Sanitary Sewers in _____

_____

This agreement, made and entered into this _____ day of _____ in the year one thousand _____ _____hundred _____ by and between the town of _____ , party of the second part.

WITNESSETH, THEREAS, The Town of _____ in the State of _____ by virtue of the authority in the Sewer Commission by Legislature of the State of _____ and by the Charter and Ordinances of the Town agrees to let unto the said _____Contractor, the work of constructing such Sanitary Sewers, as per plans and profiles on file at the office of the Engineer of Sewers.

NOW THEREFORE: In consideration of the payment covenants hereinafter mentioned to be made and paid by said party of the first part, the said _____ hereby covenants and agrees to do the work herein [illegible] in a substantial and workmanlike manner, in conformity with the plans, [illegible] and specifications [illegible]

[illegible] to the Office of the Engineer, in [illegible] obeyance to the directions which may from time to time be given by the said Engineer or his duly authorized assistants, and in accordance with the following specifications:

SPECIFICATION FOR SEWERS.

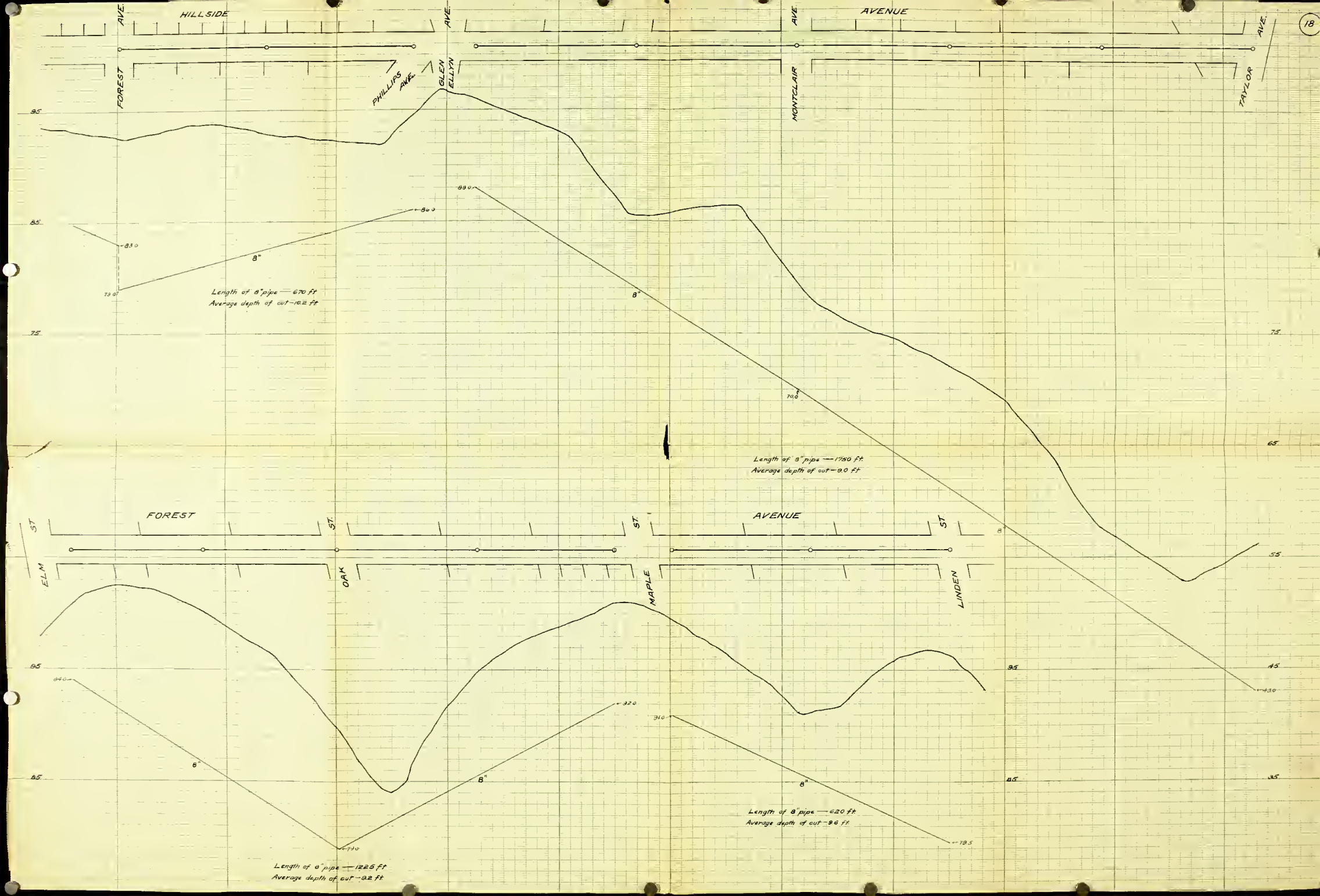
Sewer Pipe.

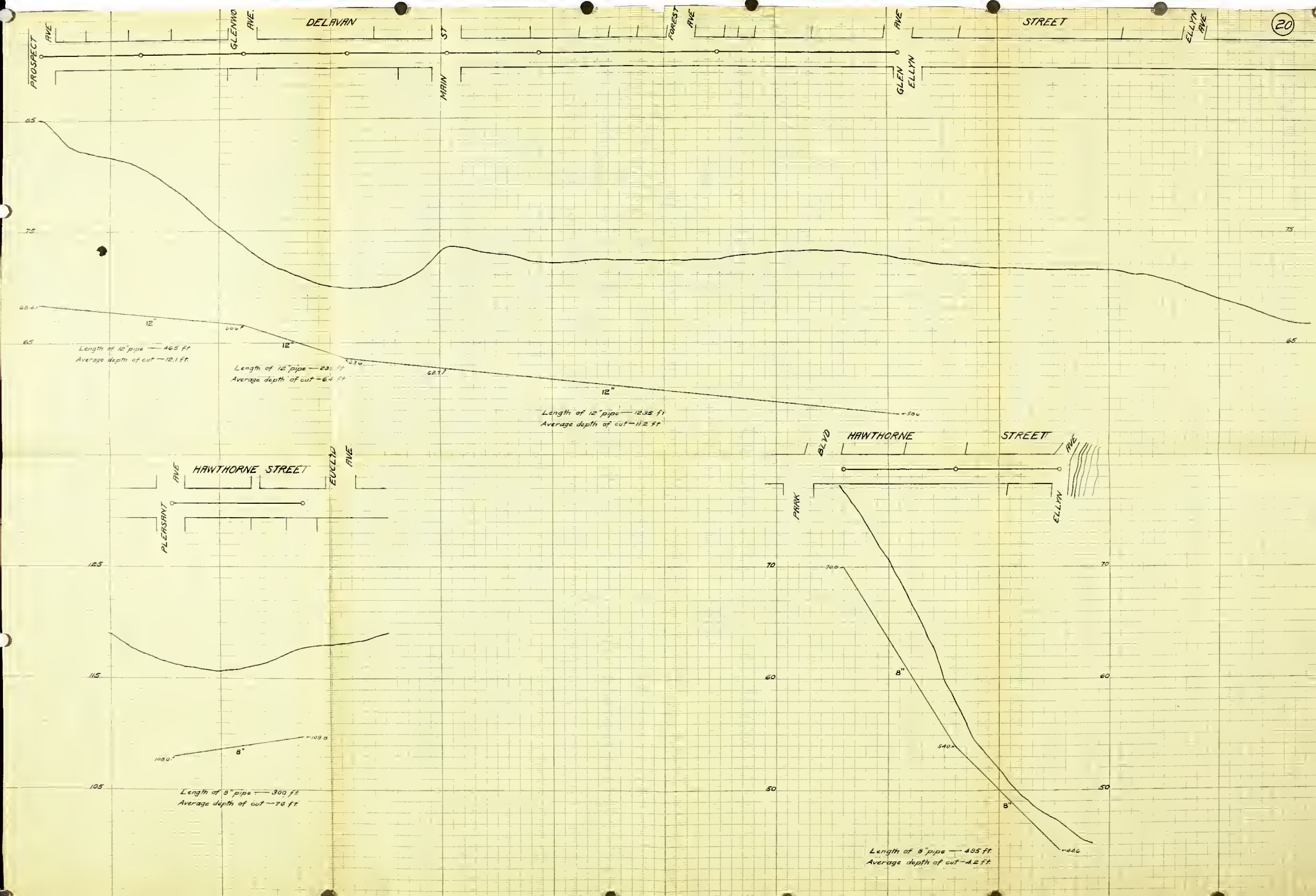
1.- The pipe shall be of first quality vitrified, salt glazed sewer pipe, sound and well burned throughout their thickness, impervious to moisture, of smooth and well glazed exterior and interior surface, free from cracks, flaws, blisters, fire checks, and all others imperfections, circular in bore, of true form in their lengths, whether straight or curved, internally of the exact specified diameter, and uniform standard thickness.

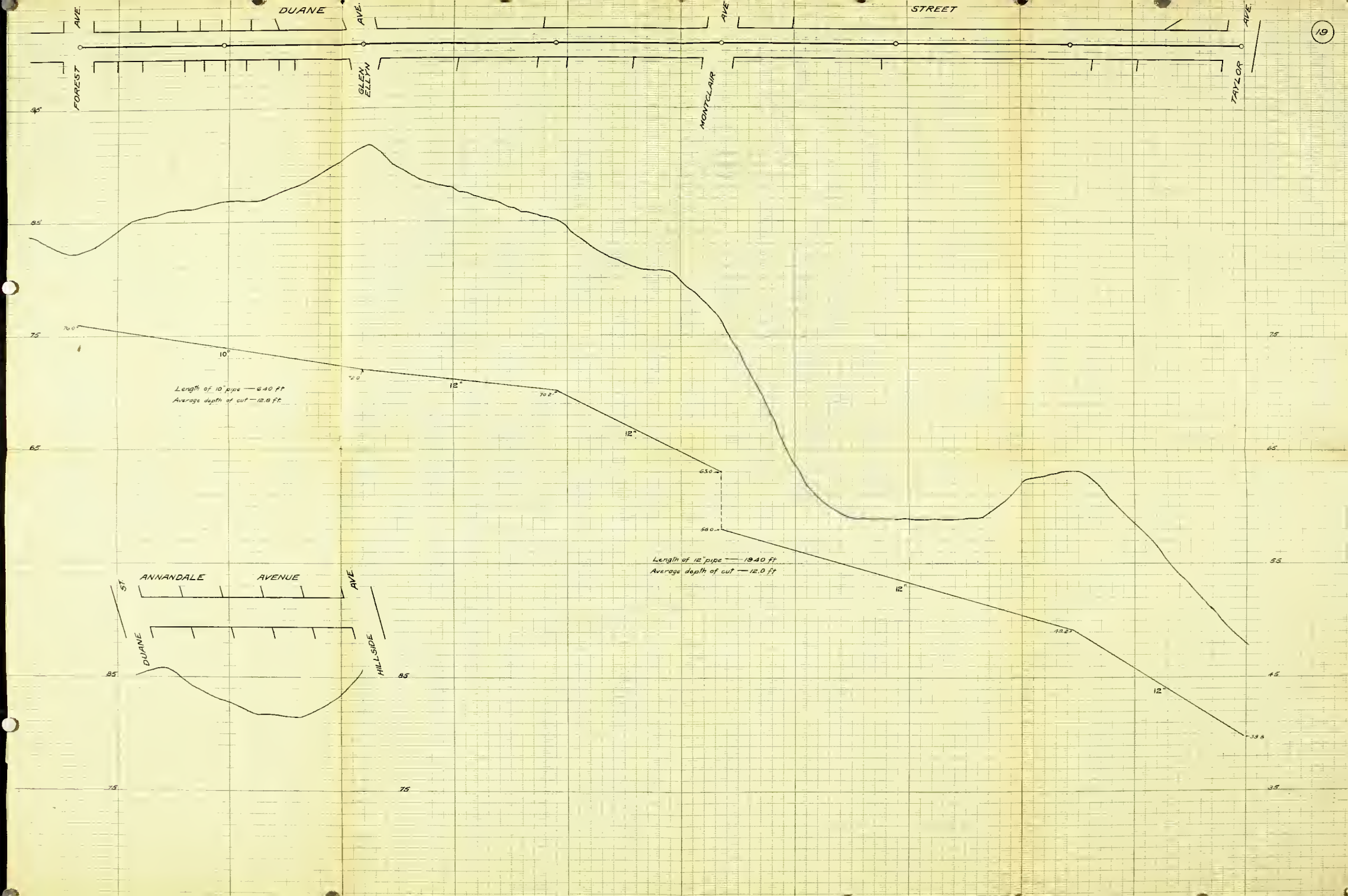
2.- All pipes shall be socket pipe, with true and circular sockets concentric with the bore of the pipe, and shall be furnished in pieces two feet long.

3.- "Y"-branches and slants will be four(4) inches in diameter and will average one for every twenty-five (25) feet of sewer.

4.- The curves, slants, and "Y"-junctions must conform to all the foregoing requirements as regards quality, form, and workmanship, and the thickness shall be equal to that of pipes of the same caliber into which the "Y"-branch may be jointed. All slant junctions and branch junctions shall be molded for an angle of forty-five(45) degrees with the sewer with which they are to connect.


HILLSIDE AVE.
AVENUE
FOREST
PHILLIPS AVE.
GLEN ELLYN AVE.
MONTCLAIR AVE.
TAYLOR AVE.
95
85
75
65
55
45
35
83.0
86.0
79.0
8"
Length of 8" pipe — 670 ft
Average depth of cut — 10.2 ft
88.0
70.0
8"
Length of 8" pipe — 1750 ft
Average depth of cut — 9.0 ft
FOREST ST.
AVENUE ST.
ELM ST.
OAK
MAPLE
LINDEN
84.0
92.0
79.0
8"
8"
Length of 8" pipe — 1225 ft
Average depth of cut — 9.2 ft
91.0
78.5
8"
Length of 8" pipe — 620 ft
Average depth of cut — 9.6 ft


PROSPECT AVE
GLENWOOD AVE.
DELAVAN
MAIN ST
FOREST AVE
GLEN ELLYN AVE
STREET
ELLYN AVE
65
75
68.4
12"
600
12"
63.0
62.7
12"
58.6
Length of 12" pipe — 465 ft
Average depth of cut — 12.1 ft.
Length of 12" pipe — 235 ft
Average depth of cut — 6.4 ft
Length of 12" pipe — 1235 ft
Average depth of cut — 11.2 ft
HAWTHORNE STREET
PLEASANT AVE
EUCLID AVE
125
115
105
108.0
8"
109.8
Length of 8" pipe — 300 ft.
Average depth of cut — 7.6 ft.
BLVD
HAWTHORNE
STREET
PARK
ELLYN AVE
70
60
50
70.0
54.0
8"
44.6
Length of 8" pipe — 485 ft.
Average depth of cut — 4.2 ft.


DUANE
AVE.
AVE.
AVE
STREET
AVE.
FOREST
GLEN ELLYN
MONTCLAIR
TAYLOR
95
85
75
65
55
45
35
10"
12"
12"
12"
12"
Length of 10" pipe — 640 ft
Average depth of cut — 12.8 ft
Length of 12" pipe — 1940 ft
Average depth of cut — 12.0 ft
ANNANDALE
AVENUE
ST
AVE
DUANE
HILLSIDE
85
75

Bricks.

5.- The bricks shall be of the best quality for the purpose for which they are intended,uniform in quality, sound and hard burned,free from lime and cracks,and have a clear ringing sound when struck,whole and with edges full and square and of standard dimensions;they shall be of compact texture and after being thoroughly dried and immersed in water for twenty-four hours shall not absorb more than fifteen (15) per cent in weight of water. A limited number of bats may be used at the discretion of the engineer.

Sand.

6.- All sand shall be clean and sharp,evenly graded and free from loam or vegetable matter.No wind drifted sand shall be used.

Cement.

7.- All cement shall be tested. A sufficient stock of cement shall be kept near the site of the work in a weather-tight and moisture-proof building. A least twelve (12) days shall be afforded for inspection and testing and if found unsatisfactory will be rejected, and must be removed from the work.

A bag of cement shall contain ninety-four (94) pounds of cement net.

Cement failing to meet the seven-day requirements may be held awaiting the results of the twenty-eight-day tests before rejection.

The aceptance or rejection shall be based on the following requirements:

Natural Cement.

8.- All natural cement must be of the best quality and tests will be made in accordance with the present standard methods of the American Society for Testing Materials,with limits as follows:

Specific gravity,not less than 2.8.

Fineness: 90 per cent,passing 100 sieve;

70 per cent,passing 200 sieve.

Time of setting: initial,not less than 10 minutes;

hard,between 30 minutes and 3 hours.

Tensile Stregth,pounds per square inch.

Age.	Neat cement.
24 hours in moist air	75.
7 days(1 day in moist air,6 days in water)	150.
28 days(1 day in moist air,27 days in water)	250.

One part Cement,Three Parts Standard Sand.

7 days(1 day in moist air,6 days in water)	50.
28 days(1 day in moist air,27 days in water)	125.

Soundness: Pats of neat cement about three inches in diameter,one-half inch thick at center,tapering to a thin edge,shall be kept in moist air for a period of

twenty-four hours.

(a) A pat is then put in air at normal temperature.

(b) Another is kept under water maintained as near 70 degrees F.as practicable.

These pats are observed at intervals for at least twenty-eight days,and,to satisfactory pass the tests, should remain firm and hard and show no signs of distorsion,checking,cracking or disintegrating.

Portland Cement.

9.- All Portland cement shall be of the best quality, and tests will be made in general in accordance with the present standard methods of the American Society for Testing Materials,with limits as follows:

Specific gravity,not less than 3.1.

Fineness: 92 per cent,passing No.100 sieve;
75 per cent,passing No.200 sieve.

Time of setting: initial,not less than 30 minutes; hard,between one and ten hours.

Tensile Strength,pounds per square inch.

Age.	Neat Cement.
24 hours in moist air	175.
7 days(1 day in moist air,6 days in water)	500.
28 days(1 day in moist air,27 days in water)	600.

One Part Cement,Three Parts Standard Sand.

7 days(1 day in moist air,6 days in water)	175.
28 days(1 day in moist air,27 days in water	250.

Soundness.- Pats of neat cement about three inches in diameter, one-half-inch thick at the center and tapering to a thin edge, shall be kept in moist air for a period of twenty-four hours.

(a) A pat is then kept in air at normal temperature and observed at intervals for at least 28 days.

(b) Another pat is kept in water maintained as near 70 degrees F. as practicable and observed at intervals for at least 28 days.

(c) A third pat is exposed in an atmosphere of steam above boiling water, in a loosely closed vessel for five hours.

These pats, to satisfactorily pass the requirements shall remain firm and hard and show no signs of distortion, checking, cracking, or disintegrating.

Sulphuric Acid and Magnesia.

The cement shall not contain more than 1.75.-per cent of anhydrous sulphuric acid (SO_3) nor more than 4 per cent of magnesia (MgO).

Stone.

10.- The stone shall be of good quality, graduated in size, angular in shape, and free from dirt or clay. All stone must be broken so as to pass through a ring one and one-half inches in diameter.

Timber.

11.- All timber and planking used in cradles, platforms, and foundations shall be of spruce, or timber equally as good, straight, sound, free from sap shakes, large, loose, or decayed knots, worm holes, or other imperfections which may impair its strength or durability. Piles shall be of sound, straight, live spruce or yellow-pine timber, of lengths specified by the engineer.

Classifications for Materials.

12.- All material excavated will be clssed under one general head, earth.

Excavation of Trench.

13.- The ground shall be excavated in open trenches, except where tunneling is considered necessary or proper by the engineer, in such direction as is required, to the width and depth as may be necessary for the proper constructio according to plan.

14.- The trenches must be of sufficient width to admit of ample room within the lines of the sheeting to admit of the work being constructed in the manner and size specified. Whenever the nature of the ground will admit of it, the bottom of the excavation is to have the shape and dimensions of the outside of the lower half of the sewers. In the case of pipe sewers it shall be one foot wider at the bottom than

the outside diameter of the pipe, and for brick sewers as wide as the greatest external horizontal width of the structure to be placed therein, without any undercutting of the banks. For pipe sewers the bottom of the trench under each bell shall be so hollowed out as to allow the body of the pipe to have a bearing throughout on the trench bottom and permit of making the joint. In case a trench be excavated at any place, excepting at joints, below the proper grade it shall be refilled to grade with sand or other readily compacted material, throughly rammed, without extra compensation unless the extra excavation was ordered by the engineer.

15.- Where streets are paved all surplus excavated material must be removed from the trench and the streets as fast as excavated by the contractor at his own expense. The sidewalk must, in no case, be obstructed, and the contractor shall make provisions at all cross streets for the free passage of vehicles and foot passengers, either by bridging or otherwise.

16.- The excavation of the works shall not advance more than six-hundred feet ahead of the completed masonry or pipe works, except where, in the opinion of the engineer, it is necessary to drain wet ground.

17.- Where rock is encountered in excavating the trenches, it is to be removed by drilling and blasting, or otherwise, to the level of the outside of the bottom of the sewer. Whenever a water main, gas pipe or other conduit crosses the line of the trench, the rock on each side of the pipe for the distance of two feet is to be removed without blasting. Where blasts are made, the trench is to be carefully covered with suitable brush or timber or matting to prevent danger to life and property and the contractor must secure a special permit for blasting. Before the sewer is built, all irregularities of the rock are to be filled with sand and gravel, well rammed into place, without extra compensation.

18.- For all rock excavation, in addition to the price per foot of sewer, the contractor will receive a compensation of three dollars per cubic yard. In estimating the number of cubic yards, an arbitrary width of the trench equal to the diameter of the sewer plus three feet will be taken, which, multiplied by the depth from the surface of the rock to the bottom of the invert of the sewer or to the bottom of the rock strata where said strata does not extend to the bottom of the trench, will be considered the rectangular section upon which estimate of quantities will be based, no allowance being made for excavation beyond these boundaries and no deduction made for the portion which may not be removed.

Boulders,one quarter cubic yard and over in size,will be measured as rock excavation. Hardpan,shale which may be picked,stiff gravel and boulder clay shall not be classed as rock,although it may be more economical to to remove same by blasting.

19.- No clain for an amount of money beyond the contract price of the work will be entertained or allowed on account of the charecter of the ground in which the trench or other excavations are made,except for the rock cutting heretofore specified.

20.- The contractor must assume the risks of meeting quicksand,hardpan,boulder clay,etc.,rubish,unforeseen obstacles,underground conduits,railroad tracks,pavements etc.,

Protection Against Water.

21.- The contractor shall do all pumping and bailing, build all drains,and do all other work necessary to keep the trench and sewer clear of ground water,sewage or storm water during the progress of the work,and until the cement mortar is sufficiently set to be safe from injury. To this end,in wet trenches,he shall keep a channel open on each side on the work during the construction,wich shall be maintained so as to catch the water from the sides of the trenches,and to conduct it to a sufficient sump or bale hole in front of the work.

22.- Wh existing sewers have to be taken up or removed, the contractor must provide and maintain temporary

outlets and connections for all private or public drains, sewers or catch basins,and must take care of all sewage and storm water which shall be received from these drains and sewers,and discharge the same,and for this purpose he must provide and maintain at his own expense an efficient pumping plant and temporary outlet,and be prepared at all times to dispose of the water and sewage received from these temporary connections until such time as the permanent connections with the new sewers are built and in service,which permanent connections shall be made by the contractor in a careful and workmanlike manner.

Sheeting and Bracing.

23.- To secure the protection of the work,the adjacent streets,buildings,or other improvements,the contractor must furnish and put in place at his own expense,braces, sheeting,etc.,as may be necessary for the safety of the work,the public or adjacent property.

24.- The sheeting and bracing shall be removed as the w work progress in such a manner as to prevent the caving in of the sides of the excavation or any damage to the masonry.

25.- The engineer may order the sheeting and the bracing left in when in his opinion it is necessary

for the proctection of the work, the public, or adjacent property. In such cases only a charge will be allowed for the same at the rate of fifteen dollars ($15.) per thousand feet B.M.

26.- The contractor shall at his own expense shore up and restore and make good, as may be necessary, all fences, buildings, walls, conduits or other properties which may be disturbed during the progress of the work, and the said contractor shall be held responsible for all damages which may happen to neighboring properties, or in any way from neglect of this precaution.

27.- The price per linear foot of sewer shall include the cost of all excavation, all temporary supports and braces that may be necessary to secure a safe prosecution of the work until the permanent structure is completed. Such temporary supports must in all cases be removed by the said contractor at his own expense after or concurrently with the completion of the permanent structure.

Interference with Existing Structures.

28.- All water, gas or other pipes or conduits shall be carefully supported and protected from injury by the contractor, either until the sewer is built and the backfilling finished, or, if necessary, until the proper person removes or changes them. Nothing in this contract and specifications shall be so construed as to

relieve any person or corporation, owning or using any pipes, conduits or tracks from the obligation to maintain and protect such pipes, conduits or tracks without any expense to the Village of Glen Ellyn or to the contractor building said sewer.

Foundations.

29.- Whenever the ground is suffiently firm and unyielding, the masonry or pipe shall be laid directly on the botton of the excavation, but whenever this is not the case and such foundation is not shown on the plans, it shall be built of masonry, concrete, or of plank and timber, as the engineer may direct.

30.- The contractor will be allowed extra compensation for his work at prices named below for the different kinds of foundations required:-

The following are the prices to be paid for foundations, timber, sheeting, etc.:

Fifteen dollars ($15.oo) per thousand (1000.) feet B.M. for plank and sheeting left in place.

Seven dollars ($7.oo) per cubic yard for brick masonry.

Six dollars ($6.oo) per cubic yard for concrete.

31.- Mortar.

The mortar for brick work shall be made by carefully measuring and thoroughly incorporating one(1) part of natural cement with two(2) parts of clean, sharp sand in dry state, mixed with clean water to the proper

consistency, and shall be used while fresh, and the use of mortar which has ~~st~~ set, and then been retempered will not be allowed.

32.- The mortar used in laying pipe sewers shall consist of one(1)part of natural cement and two(2) parts of clean, sharp sand mixed and used as above specified, all to be furnished by the contractor without extra charge. All that part of the sewer surrounding Lake Ellyn shall be laid in protland cement mortar, consisting of one(1)part cement and three (3) parts sand.

Concrete.

33.- All concrete shall be composed of one(1)part portland cement, three(3)parts of clean torpedo sand or limestone screenings, and six(6)parts of broken stone. The cement and sand shall be measured and shall be thoroughly mixed dry, until the mixture is of a uniform color, and shall be wet with as little water as will render it proper for use, and thoroughly worked. The stone shall then be added and the whole shall be mixed until each stone is thoroughly coated with mortar. At least one(1)barrel of cement shall be used for each cubic yard of concrete.

Brick Masonry.

34.- Unless otherwise noted on the proposal sheet, all

brick sewers, the internal diameters of which are two feet, shall be built of one ring of brick; all brick sewers, the internal diameter of which exeed two feet, shall be built of two rings of brick.

35.- The most perfectly formed bricks and those with the smoothest surfaces are to be used in the inside of the sewer, the smoothest edge of the brick being laid to the surface. The courses are to be laid in line and kept perfectly straight in the direction of the sewer and parallel to the rise of the same, and shall be laid as stretchers, braking joints with those in the adjacent courses. Every brick must be laid separately in full mortar joints on bottom, side, and end. No joint shall exeed one-half of an inch(1/2") in thickness and all joints on face shall be trowel struck. The mortar joints on the inside of the sewers, below the center line, are to be carefully struck when laid, and those above the ground scraped smooth with the bricks immediately after the centers are struck. The refuse mortar to be scraped off and removed entirely from the sewer before it has time to harden.

36.- No work in masonry shall be done when the thermometer is beloww thirty degrees Fahrenheit(30°F.) without permission from the engineer, and then under conditions for protecting it from frost approved by him.

37.- All that part of the twenty-four inch sewer from its extreme northern end to Crescent boulevard shall be laid in full joints of portland cement mortar.

Extreme precautions must be taken to make the sewer water tight.

The entire outer surface shall be plastered with one-inch (1/2") of mortar composed of one part of portland cement and two parts of clean torpedo sand,and only sufficient water added to work the mortar easily.

38.- All inverts on botton courses are to be laid in line from templets,accurately made and correctly set to the lines and grades furnished.

The centers,patterns,and templets necessary in the construction of the work are to be furnished by the contractor at his own expense.

The number of templets necessary for each gang of masons,is two.

Each templet should be an exact duplicate of the other,and must conform to both the inside and the outside shape of the sewer.

Pipe Laying.

39.- No pipe shall be laid except in the presence of an authorized inspector. The contractor shall notify the inspector whenever he is ready to lay pipe in any particular ditch. The engineer shall have the power to order the removal and relaying of any pipe laid without his order,or in the absence of the inspector from the work. The engineer shall use such means as he deems proper for having the pipe laid properly to grade,and the contractor shall provide him with all stakes,grade boards,or twine necessary for that purpose.
Should the ditch be excavated below the required depth, the contractor shall fill the same to grade with material at his own expense,and tamp it thoroughly before laying down the pipe. If found necessary to lay any pipe on a fill,the earth shall be thoroughly rammed and compacted in the fill before the pipe is laid. The pipe and specials shall be so laid in the trench that after the the sewer is completed,the interior surface thereof shall comform on the bottom accurately to the grades and alignments fixed and given by the engineer.

40.- The main sewer will be divided by man-holes into a number of divisions or working sections,in each of which the grades and alignments shall,under ordinary circunstances,be truly straight. Changes of grade in direction,or both,in the sewer,will be made at manholes.

41.- The joints between pipes shall be caulked with oakun to prevent the entrance of cement into the interior of the pipes,and then the annular space between the exterior of the spigot end and the interior of the hub shall be filled completely with mortar composed of one part of natural cement and two parts of sand. This mortar must be put in place by hand,and no trowel shall be used for this purpose.

42.- The contractor shall furnish a bag stuffed with shavings or hay,of a size sufficient to fill the pipe rather tightly,together with a rope. The bag must be placed in the first pipe,the rope passing through each pipe as it is laid down. After the joints are made,the bag is to be drawn forward at such times,before the cement has set,as to smooth off and produce a true surface, at each cement joint.The joint being furnished,great care must be taken not to disturb the pipes by stepping on or near them,by throwing earth upon them from the bank,or otherwise.

When the branch is left open for the night or the pipe laying is stopped by storms,care shall be taken that the end of the line of pipe is closed so as to exclude dirt and rubbish.

Junction of Sewers.

43.- The junction of two or more sewers must be made in strict comformity with the plans. The work must be done with special care and in a perfect manner and the

brick at the joining edges must be shaped smoothly to proper curves and the two sewers joined with a through bond,the cost of all junctions to be included in the price pervlinear foot of the main sewer.

44.- Whenever required,the brick interceptions are to be strengthened by backing up the angles with piers of masonry. The junctions are to be blocked off at the ends,thoroughly closing them. When connections are made with sewers carrying water,special care must be taken that no part of the work is built under water. A flume or dam must be put in and the new work kept dry until finished.

Side Junctions.

45.- Interceptions of lateral sewers,whether of brick or pipe,are to be built into the sewers at such places as re shown on plans. Four-inch junctions for house drains,to commence twelve and one half (12.5) feet from street corners and to be placed thence twenty-five (25) feet apart through the blocks,or as otherwise shown on the plans,shall be built into the sewers in a thorough and workmanlike manner. The pipe junctions are to be closed by cementing in a tile disc or stopper In no case are bricks to be plced inside the pipe. All dead ends of the sewers are to be clsed with eight (8) inches of brick work.

46.- In brick sewers all junctions shall be slants

with one end cut at an angle of approximately forty-five degrees (45°) with the axis of the slant, and the other formed into a socket which shall be closed by cementing in a tile disc or stopper. The length of the short side of the slant not including the socket shall not be less than six inches(6") for one ring of brick masonry or twelve inches(12") for two(2) rings of bricks masonry.

47.- Whenever the center of the sewer is more than ten feet below the surface of the ground, the house connections shall be extended by means of four inch (4") tile pipe to a point not more than ten feet(10.ft) below such surface, and shall be sealed as provided for the junctions. Whole lengths of pipe only shall be used in such work.

48.- The cost of house slants, etc., is to be included in price bid for sewer, except where additional four-inch pipe is used to bring them to a point not greater than ten feet below the surface of the ground, when such additional pipe shall be paid for at the rate bid.

Manholes, Drop Manholes, Covers.

49.- All manholes are to be circular in section and three feet in diameter. They are to be built with two rings of brick, giving a thickness of eight inches to the wall. The bricks in the inside ring are to be set vertically. The outer ring may be built of bats as

far as broken bricks on hand will go,otherwisw whole bricks are to be used. They shall be plastered on the outside and washed with a coat of clean cement on the inside.

50.- The invert of the sewers through the manholes shall be built on two rings of brick,and on each side thereof shall be built of solid brick foundation twelve inches thick,making the entire foundation four (4) feet six (6) inches in diameter.

51.- The top of the manhole is to be two (2) feet in diameter,being drawn in by means of six (6) header courses,the diameter being decreased two inches for each course and an iron cover set thereon. On unpaved streets,the top cover of the manhole are to be at the surface of the streets,on paved streets,1/2 inch lower.

Drop Manholes.

52.- Drop manholes,circular in section and three feet in internal diameter,shall be constructed as shown on plans. The price for drop manholes shall include the complete construction except the pipe,which shall be considered under its own price.

Iron Steps.

53.- Wrought iron steps of five-eights of an inch round iron,having a tread of four inches by ten inches shall be placed at intervals of fifteen inches in both manhole and drop manhole.

Iron Covers.

54.- Each manhole and drop manhole shall be provided

with a cast iron cover with a tight lid,each of which covers shall weigh three hundred and forty(340)pounds, and shall be of the same size and pattern as shown on drawings. The top of said covers shall be at the elevation of the adjacent surface of the ground.

Back Filling

55.-After the arch is completed on any length of sewer, and before the centers are struck,the trench is to be filled to a height of not less than one foot above the arch. On brick sewers the spandrels are to be well consolidated by thorough ramming whenever the ground is of a nature to admit it.As soon as the mortar and masonry are sufficiently set,the trench is to be sufficiently filled to prevent liability of injury to the banks,road surfaces,adjacent pipes,railroad tracks, sidewalks,or other property,either public or private. The trench shall be flooded with water and the back filling completed.

56.- The back-filling shall in all cases be left with a smooth and even surface and a sufficient crown. Where required the back-filling shall not be left unfinished more than six-hundred(600)feet behind the completed masonry pipe work.

57.- The sewers shall in all cases be covered with earth to a depth of not less than two feet,and where the trenches do not furnish sufficient material the

contractor shall supply such deficiency at his own expense.

58.- When additional filling is required to be placed over the sewer for its protection, the contractor shall furnish and spread earth, cinders or clean ashes, free from animal or vegetable matter, in such a manner and in sufficient quantity so that after it is thoroughly compacted, the embankment shall be of uniform grade and cross-section. The top of the filling shall be four feet wider than the outside diameter of the sewer which is being covered, and the side slopes shall fall one and one-half feet horizontally. The cost of this filling shall be included in the price bid per lineal foot of sewer.

Restoration of the Surfaces of Paved Streets.

59.- In all streets or parts of streets that are paved graveled or macadamized, all the back-filling is to be well rammed with suitable tools in layers not exceeding twelve inches in depth, provided the ground be clay, stiff loam or of a tenacious nature. If the ground be sand or gravel, the back-filling is to be puddled. After being puddled or rammed to the required height, the pavement shall be relaid carefully and thoroughly in a manner adapted to its peculiar character and to the satisfaction of the engineer.

60.- When the work is completed all surplus material, earth, rubbish, etc., must be removed and the surface of the streets included in this contract must be left in as good condition as it was before the commencement of the work, and it must be maintained in such condition during a period of one year after the acceptance of the work.

Cleaning Up.

61.- As soon as the trench has been refilled and paving replaced, all stones, plank, or other refuse material of whatever description deposited and left by the contractor on the streets, shall be removed therefrom and the said streets restored in all respects to the same condition as before the trenching was commenced. All surplus earth which may be left on the street after the trenches have been refilled as specified above and which is not desired and removed by the city shall be regarded as the property of the contractor, and must be removed as soon as possible at his expense.

Final Inspection.

62.- Upon notification by the contractor of the completion of the work herein contracted for, the engineer will carefully inspect all sewers, appurtenances, and all other work done by the contractor. In each stretch of pipe sewer intended to be straight, light shall be visible from one end to the other. Any

broken or cracked pipes shall be replaced with sound ones. The interior of brick sewers shall be of the required shape and dimensions, sound and of a uniform surface. Any deposits found in the sewers, protruding cement or packing, shall be removed and the sewer-bore left clen and free through its entire length. All manholes and other appurtenances shall be of the specified size and form and of a neat appearance, and their tops shall be set to the proper grade. In general the work shall comply with these specifications, and if found not to do so in any respect, shall be brought to the proper condition by cleaning, pointing, or, if necessary, excavating to and rebuilding, al at the expense of the contractor. But if it be found after uncovering any pipe or other work at the order of the engineer that no defect exist, or that the defect was not due to any fault of the contractor, then the expense of this shall be borne by the city.

Unit Prices

63.- All materials incorporated in this inprovement, unless otherwise specified, shall be paid for at unit prices, as shown on the proposal sheet, said proposal sheet becoming a part of the contract.

Prosecution of Work.

64.- In order that the work may be prosecuted as rapidly as possible, it is hereby specified that the

contractor shall keep at least three complete and separate gangs of men, trenching machines, masons, etc., constantly at work on distinct and separate parts of this contract, and in addition shall have another gang, if ordered by the engineer, working on the purification plant. This paragraph will be rigidy enforced, and the separation of one gang into two parts, or any similar evasion of the spirit of this paragraph, shall be cause for the enforcement of the paragraph headed "CONTRACTOR'S DEFAULT."

65.- Daily Report.

The contractor shall make a full report daily to the engineer of the number and ocupation of the men, teams, etc., employed on the work, and also the amount, kind and place of disposal of all material received by him. He shall also furnish each day in a book kept by him for that purpose the accurate location of the "Y"-slants furnished and set by him, the distance of each of said slants being measured from the center of the preceding manhole. This record is to be kept by one man in the contractor's employ, and for any reason this man neglects this phase of the work, or keeps his record of such measurements in a slovenly, illegible or careless manner, in the judgement of the engineer, such neglect shall be cause for instant dismissal, and the engineer may direct that a man meeting his approval shall be

employed by the contractor for this purpose.

Use of Public Water.

66.- The contractor shall obtain a permit from the village authorities for the use of the public water supply,but will not be required to pay any compensation for such use. He shall,however,be subject to strict inspection as to the amount used and any careless or wastefull expenditure of such water,the engineer being the judge,shall be caused for the abrogation of this privilege,and the payment therefor by the contractor of the legak rate for water charged by the Village of Glen Ellyn for such service.

The Use of Private Property.

67.- The contractor shall not be allowed to accupy or use any private property as a depository for stone,sand gravel or other material without the written consent of the owner or agent of the land,a copy of which shall be filed with the engineer.

Railroads,Obstructions,etc.

68.- All railroads or other obstacles,not required to be taken up,must be kept in running order and good condition where practicable. No allowance will be made for delays or other damages occasionesd by the necessity of keeping the railroads in constant running order,or for removing or replacing the same when it is necessary to do so,or for taking care of,removing

and replacing any obstruction.

Employes.

69.- The contractor shall employ capable foremen or superintendents to represent him on the work,and they shall receive and obey orders from the engineer. The engineer shall have authority to order the dismissal of any employe on the work who refuses or neglects to obey any of his instructions as to the carryng out of the provisions and intent of these specifications,or who is incompetent,unfaithful,abusive,threatening or disorderly in his conduct,and such person shall not be again employed on the work.

Extras.

70.- No extras will be allowed or paid for unless they be ordered in writing by the engineer. For extras so allowed the contractor will be paid actual cost plus fifteen (15) per cent for profit. The actual cost shall be the original cost and shall not consist of a sub-contractor's cost plus sub-contractor's profit plus fifteen per cent.

No customary or trade measurements will be allowed,but all measurements shall be based on actual volume,lineal feet,square feet or yards,or other unit used in the bidding sheet and contract.

Alterations in the details of construction made during the progress of the work shall not destroy the binding

effect of the contract,but such alterations shall be and become an integral part of the construction,and will not be paid for as extras unless it is manifestly impossible to consider them as units of the work,the engineer being the judge.

Direction,Superintendence and Inspection.

71.- The contractor shall perform all the said work under the direction and superintendence of the engineer and to his entire satisfaction,approval and acceptance. All material to be incorporated in the work and all labor performed,and all appliances,tools and methods used shall be subject to the inspection and approval of said engineer,and the said engineer reserves the right to decide finally all questions arising as to the proper performance of said work and as to whether the rate of progress thereon is such as to correspond with the conditions of these specifications.

72.- The contractor shall furnish and drive all stakes, and at any time requested by the engineer or his representative shall furnish all assistance desired by said engineer.

73.- Whenever the word"Engineer"is used in these specifications it shall be considered to mean .....

.....

74.- Whenever the word"Contractor"is used in these specifications,it shall be understood to mean the person

or persons,firm or corporation to whom the work herein described has been let.

75.- Whenever the word "Board" is used in these specifications it shall be understood to mean the Board of Local Improvement,the Board of Directors,the Board of Public Service or any other body under whose supervision the work outlined in these specifications shall be constructed,as specified by the laws of the state where said work is being done,or in case said work is contracted and paid for by an individual,the word"Board"shall be understood tomean such individual.

Assignment Prohibited.

76.- No part of the work herein specified shall be assigned or subcontracted without the written consent of the Board and in no case shall such consent relieve the contractor from the obligations herein entered into by him,or change the terms of this agreement.

Liability of Contractor.

77.- If,in the prosecution of the said work,it should become necessary to dig up,use or accupy any street, alley,highway or public grounds of said village,the contractor shall erect and maintain such strong and suitable barriers,and also during the night time such lights as will effectually prevent the happening of any accident,or harm to life,limb or property in

consecuence of such digging up,use or occupancy of said street,alley,highway or public ground,and the contractor shall be liable for all damages of every kindand nature occasioned by reason of his failure to comply with any of the provisions mentioned in this paragraph. Said contractor shall also be liable for any damage to persons or property occasioned by the negligence of such contractor,his agents,employes, workmen or assignees.

Manner of Payment.

78.- If the rate of progress shall be satisfactory to the Board and when it appears that all claims for labor as aforesaid have been satisfied,estimates may be issued to said contractor monthly during the making of the said improvement for eighty-five per cent (85%) of the value of the work done in place at the time of issuing such estimate,and estimates for the balance or remainder shall be issued upon the final completion and acceptance of the work,except as hereinafter noted.

Acceptance of Work by Village.

79. The Board of Local Improvements reserves the right to pass on the final acceptance of the work,and if,in its opinion,any part of the work has been improperly inspected by the engineer or inspector in charge,it may order the removal of the defective material and its replacement by the contractor without additional cost

to the village.

Time for Completion of Work.

80.- The work to be performed under these specifications shall be commenced as soon as possible after the time of signing the contract for same, and shall be completed on or before..... and the said time specified for the completion of the work is an essential condition of this contract; provided, however, that if the contractor is delayed by the Village of Glen Ellyn in the commencement of the work or in case the work is suspended by order of the engineer, then the time of such delay or such suspension shall be added to the time for the completion of this contract, unless such suspension is caused by faulty work or methods of the contractor.

Suspension of Time.

81.- In case the Board, notwithstanding the failure of the contractor to complete the work within the time specified, shall permit the said contractor to proceed and continue and complete the same as if such time had not elapsed, such permission shall not be deemed a waiver in any respect by the Board of any forfeiture or liability for damages or expense thereby incurred arising from such non-completion of said work within the time specified and covered by the liquidated damage clause of the specifications, but such liability shall

continue in full force against the contractor as if such permission had not been granted, and the said contractor must in any case pay for the cost of the engineering supervision and inspection after..... ....., said cost of which will be at the rate of forty ($40) dollars per week, which amount shall be permanently withheld from the amount due the contractor.

Liquidated Damages.

82.- For each day of delay beyond the day set in these specifications for completing the work, all in accordance with the plans, specifications and directions of the engineer, the Board shall withold permanently from the contractor as total compensation the sum of twenty ($20) dollars less the amount paid for engineering, supervision and inspection as provided above.

Contractor's Default.

83.- The said work shall be prosecuted with such force as the engineer deems adequate to its completion within the time specified, and if at any time the contractor refuses or neglects to prosecute the work with a force sufficient, in the opinion of the said engineer, for its completion within the said specified time, or if in any event the contractor fails to proceed with the work in accordance with the requirements and conditions of these specifications, the Board shall have full right

and authority to take the work out of the hands of the contractor and to employ other workmen to complete the unfinished work,and to deduct the expense thereof from any money that may be due and owing the contractor or to relet the same to other contractors.

84.- In case the contractor abandons or in any way or manner fails to complete said work in the time herein specified,the village treasurer is hereby authorized and empowered to pay any laborer or laborers who have been employed by such contractor upon the specified work out of any of the funds due such contractor any and all sums of money which may be found to be due and owing to such laborers and without giving any notice whatsoever to said contractor of the intention so to do,and in every case the engineer or village treasurer is hereby authorized and empowered to ascertain the amount or amounts so due or owing to such laborer or laborers from said contractor in such manner and upon such proof as he may deems sufficient,and without any notice of such proceeding to such contractor,and the amount or amounts so found by him to be due and owing to such laborer or laborers shall be final and conclusive as against said contractor and may thereafter be paid over by said village treasurer to such laborer or laborers. The failure of the Board to comply with the conditions of these specifications in regard to

unpaid laborer or laborers shall in no wise affect the liability of the contractor or his sureties to the Village of Glen Ellyn or to the person or persons who are or who may have been in his employ.

Forfeiture of Contract.

85.- If the work is not begun at the time herein stipulated, or if the rate of progress at which work is performed should not, in the judgement of the engineer, be such as to insure its progress and completion in the time and manner herein stipulated, or if said work shall be wholly or in part improperly conducted, then the Board may declare the contract for said work forfeited, either as to a portion or the whole of said work, and may relet the same, or order the entire reconstruction of said work if improperly done, and in any case of default may determine ~~de~~ the damage or price (if there be any) which according to a just and reasonable interpretation of the specifications and the contract as a whole, the contractor ought, in opinion of said Board, to pay the Village of Glen Ellyn for any failure to commence and prosecute or to construct said work in all respects according to the conditions herein specified or for any other default. It is further understood and agreed that for the amount of damage or price determined by said Board to be paid to the Village of Glen Ellyn by said contractor for any such

default or for any money paid out by said Village of Glen Ellyn on account of said contractor in consequence of said default, there may be applied in payment thereof a like amount of any money that may be due and owing to the contractor. If there should not be a sufficient amount retained from said contractor, then and in such case the amount to be paid by the said village in consequence of such default shall be a just claim against said contractor and be recovered from him or his bondsmen at law in the name of the Village of Glen Allyn before any court of competent jurisdiction.

86.- In case said Board deems it necessary to declare any portion or section of said work forfeited, it is expressly stipulated and understood that such declaration of forfeiture shall not in any way relieve said contractor from the covenants and conditions of the contract for said work, but that the same shall be and remain valid and binding on said contract.

Guarantee.

87.- It is understood and agreed that all labor and material shall be of such a character that the entire work, including the restoration of the surface of any street, shall be and remain in good condition during the entire period of one(1) year from the acceptance of the work, and the contractor hereby agrees to keep in perfect repair during such period the whole of his

work, except in cases where the repairs may be rendered necessary by causes clearly beyond his control.

88.- In the event that any pavement, sidewalk, crossing or other surface which may have been disturbed in the preservation of the work shall not be restored by the contractor within a reasonable time after the completion of the work and the acceptance of the same by the Board, or if any such pavement, sidewalk, crossing or surface, because of the settlement of the backfilling or other conditions incident to construction be in bad condition during the period of one(1) year after the acceptance of the work, or if any of the contractor's work be found defective or incomplete during such period, and the contractor neglects to repair such defective work within thirty days from the notice on the Board directing him to make such repairs, the Board may make such repairs and restoration of the surface of the streets or other surface at the expense of the contractor, and may deduct the cost thereof from any money belonging to the contractor in the control of the Board, or he may recover the said cost in any court of competent jurisdiction from the bondsmen of the contractor.

In witness whereof, the [illegible] _____

_____

has caused its name to be affixed by _____

_____ hereunto duly authorized

and the said _____, party

of the second part h____ hand, the day and year aforesaid.

ATTEST.

_____

_____

_____

_____

_____

BOND.

KNOW ALL MEN BY THESE PRESENTS:

That we.....

as principal and.....

as surities are firmily held and bound unto the Board of Local Improvements of the city of Glen Ellyn, Illinois, their successors and assigns, in the sum of..... dollars, lawful money of the United States of America, to be paid to the said Board of Local Improvements, their certain attorney, their successors or assigns, and for which payment, well and truly to be made, we bind ourselves, our heirs, executors, administrators jointly and severally, firmily by these presents, sealed with our seals and dated the.....

WHEREAS; The said.....ha....entered into the annexed contract with the Board of Local Improvements of the city aforsaid, bearing date..... for the construction of a system of sewers in and for said city; now the condition of this obligation is such, that if the said contractor shall well and truly keep and perform all the stipulations, agreements, terms and conditions of the said contract on .....part to be kept and performed, shall indemnify and save harmless the said Board of Local Improvements and the said city against, and shall pay upon demand to the said Board of Local Improvements,

all damages,costs,and expenses caused by and in every way growing out of the failure of said.....
.....to keep and perform all the stipulations, agrements,terms and conditions of said contract,on.....
....part to be kept and performed,then this obligation shall be of no effect;otherwise to remain in full effect and virtue.

.....(Seal)

.....(Seal)

.....(Seal)

Signed and delivered in presence of.....

E S T I M A T E

OF

APPROXIMATE COST OF CONSTRUCTION

OF

SANITARY SEWER SYSTEM

FOR THE

TOWN OF GLEN ELLYN, ILLINOIS.

Table of Approximate Cost of Sewer.

Size in Inches	Length in Feet	Average Cut in Feet	Cost per Foot	Total Cost
8	73,885	9.4	$0.90	$66,517.00
10	8,100	11.1	1.10	8,910.00
12	7,020	9.8	1.25	8,775.00
15	785	7.0	1.00	785.00
18	3,015	5.2	1.40	4,221.00
24	5,440	10.8	2.05	11,152.00
27	1,540	12.1	3.40	5,236.00
30	4,150	7.0	3.60	14,940.00
		Total.....		$121,114.00

Including all slants and "Y" junctions.

308 Manholes, complete @ $25.00..... 7,700.00

13 Drop Manholes, complete @ $40.00..... 520.00

Grand Total..... 129,334.00

LINK TO PETITION.

STREET.	BETWEEN	PROFILE No.
Anthony St.	Newton & Park	27.
Brandon Ave.	Hillside & Hill	21
Bryant Ave.	A.E.& C.Ry.& Hill	3
Carleton Ave.	A.E.& C.Ry.& Cherry	3
Cherry St.	Carleton & Bryant	3
Cottage Ave.	Newton & Forest	11
Delevan St.	Prospect & Glen Ellyn	20
Duane St.	Lorraine & Forest	17
Duane St.	Forest & Taylor	19
Ellyn Ave.(West)	Reed & Crescent	5
Ellyn Ave.(East)	Ellyn (West)& Ellyn (West)	22
Elm St.	Western & Park	4
Euclid Ave.	Elm & Hawthorne	24
Forest Ave.	Duane & Turner	14
Forest Ave.	Elm & Linden	18
Forest Ave.	Linden & Delevan	28
Glen Ellyn Ave.	A.E.& C.Ry.& Highview	7
Glen Ellyn Ave.	Pennsylvania & Delavan	7
Glen Wood Ave.	Duane & Turner	15
Hawthorne St.	Pleasant & Euclid	20
Hawthorne St.	Park & Ellyn	20
Highland Ave.	Elm & Linden	24
Highview Ave.	Glen Ellyn & Taylor	8
Hill Ave.	Newton & Montclear	9
Hill Ave.	Montclear & Bryant	10

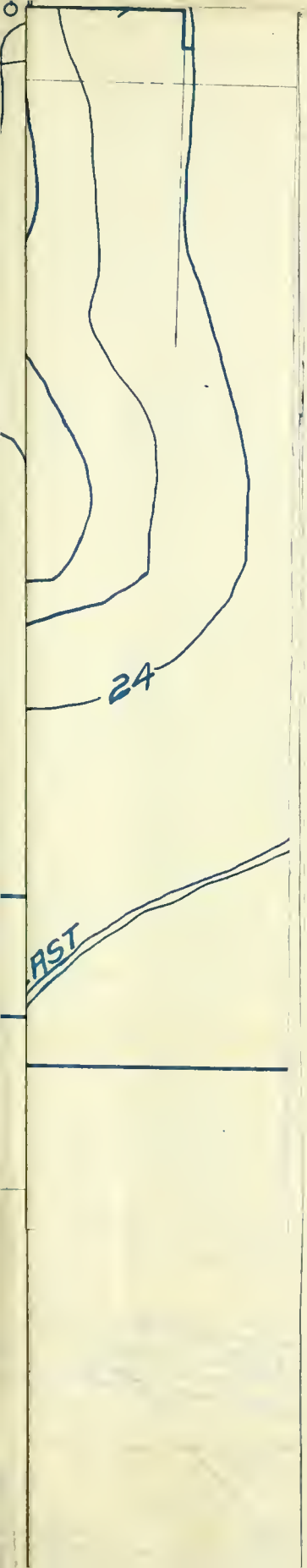
STREET	BETWEEN	PROFILE No.
Stacy Court	Elm & Oak	32
Taylor Ave.	A.E.& C.Ry.& Highview	6
Western Ave.	Geneva Rd. & Pennsylvania	23

N.B.

Line crossing Crescent Blvd.from Ellyn Ave.(East Branch) to Walnut and Taylor.....Profile No.28

Line from Orchard to Hill,between Longfellow and Whittier.....Profile No.29

Line from Taylor to Carlton,between Duane and Cherry.....Profile No.29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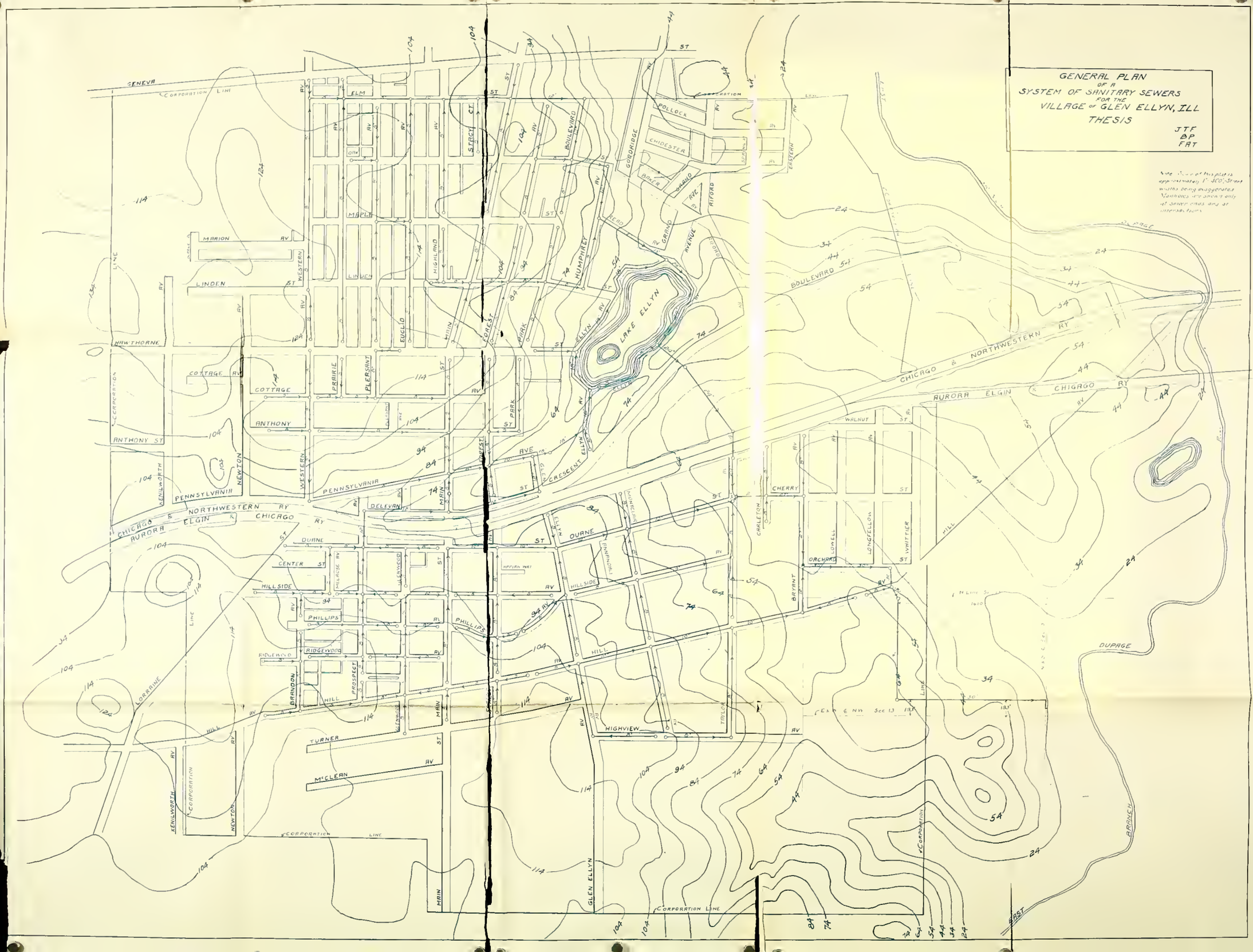
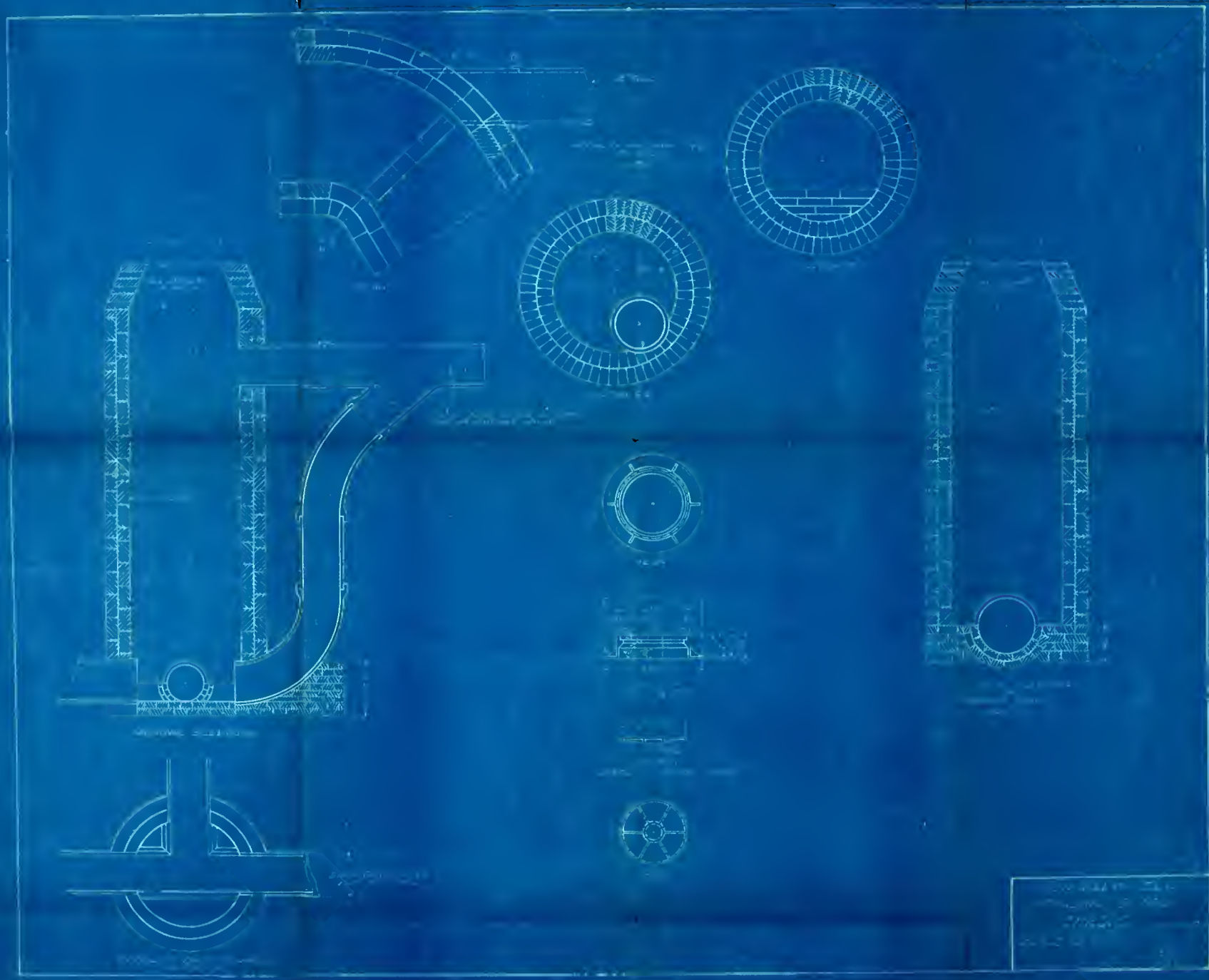

GENERAL PLAN
OF A
SYSTEM OF SANITARY SEWERS
FOR THE
VILLAGE OF GLEN ELLYN, ILL
THESIS
JTF
BP
FAT
LAKE ELLYN
CHICAGO & NORTHWESTERN RY
AURORA ELGIN & CHICAGO RY
PENNSYLVANIA
BOULEVARD
GLEN ELLYN
CORPORATION LINE
DUPAGE
BRANCH
EAST



INDEX TO PROFILES.

STREET	BETWEEN	PROFILE NO.
Anthony St.	Newton & park	27
Brandon Ave.	Hillside & Hill	21
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Glen Ellyn Ave.	Pennsylvania & Delavan	7
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Hawthorne St.	Pleasant & Euclid	20
Hawthorne St.	Park & Ellyn	20
Highland Ave.	Elm & Linden	24
Highview Ave.	Glen Ellyn & Taylor	8

STREET	BETWEEN	PROFILE NO.
Hill Ave.	Newton & Montclear	9
Hill Ave.	Montclear & Bryant	10
Hillside Ave.	Lorraine & Forest	17
Hillside Ave.	Forest & Taylor	18
Humphrey Ave.	Oak & Linden	5
Linden St.	Highland & Humphrey	2
Lowell Ave.	Orchard & Cherry	4
Main St.	Lake & Linden	15
Main St.	Duane & Turner	15
Main St.	Linden & Delavan	16
Maple St.	Pleasant & Euclid	26
Melrose Ave.	Duane & Hillside	28
Molclair Ave.	A.E. & C. Ry. & Highview	29
Oak St.	Forest & Humphrey	2
Oak St.	Prairie & Pleasant	4
Orchard St.	Bryant & Hill	3
Park Blvd.	Elm & Hawthorne	13
Park Blvd.	Hawthorne & Anthony	14
Pennsylvania Ave.	Glen Ellyn & Ellyn	7
Pennsylvania Ave.	Western & Glen Ellyn	21
Phillips Ave.	Brandon & Forest	11
Phillips Ave.	Forest & Glen Ellyn	12
Pleasant Ave.	Elm & Cottage	25

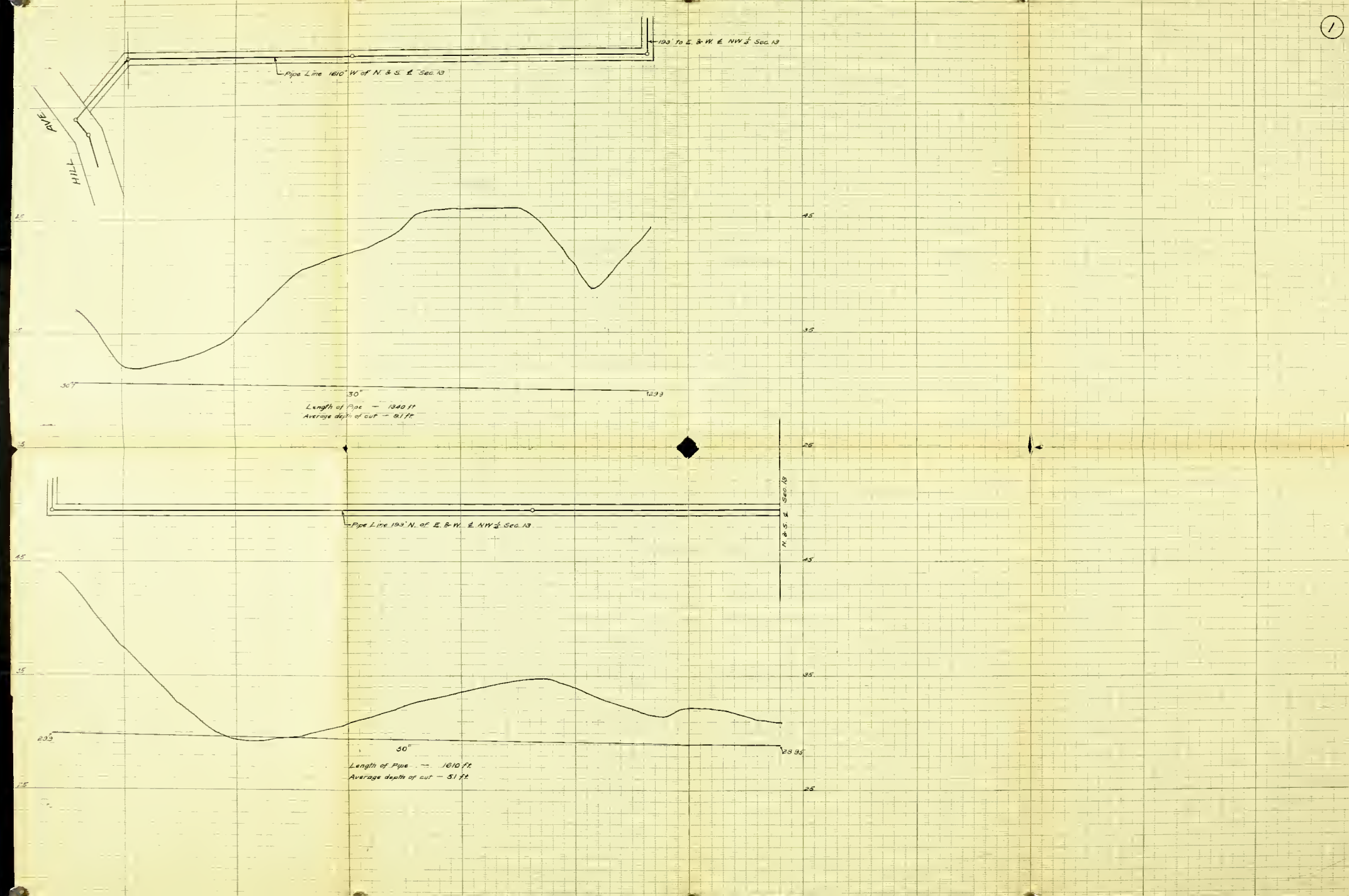
STREET	BETWEEN	PROFILE NO.
Prairie Ave.	Geneva Rd. & Cottage	26
Prospect Ave.	Delavan & Hill	12
Read Ave.	Humphrey & Grand	5
Ridgewood Ave.	Brandon & Main	8
Stacy Court	Elm & Oak	25
Taylor Ave.	A.E. & C. Ry. & Highview	6
Western Ave.	Geneva Rd. & pennsylvania	23

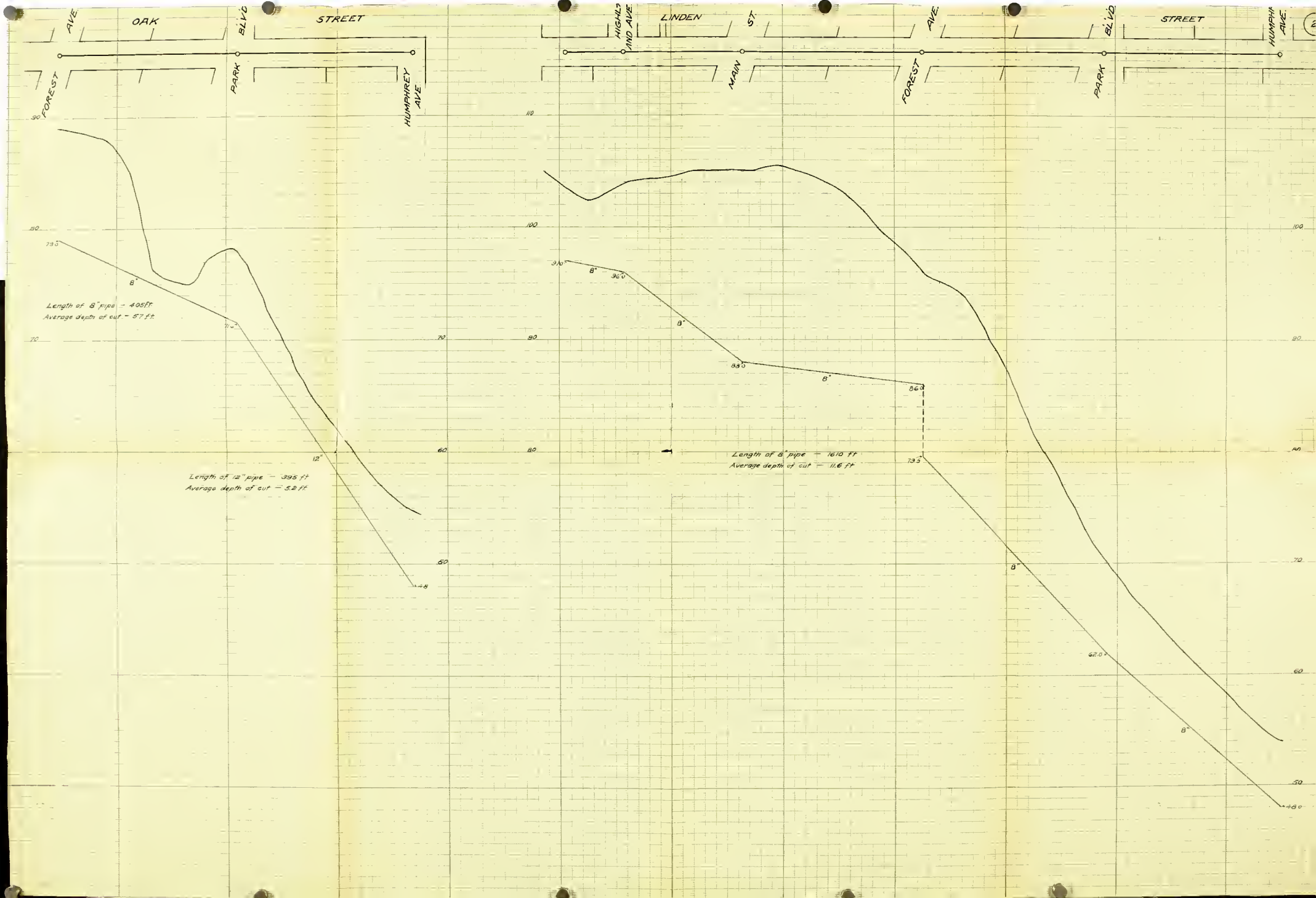
N.B.

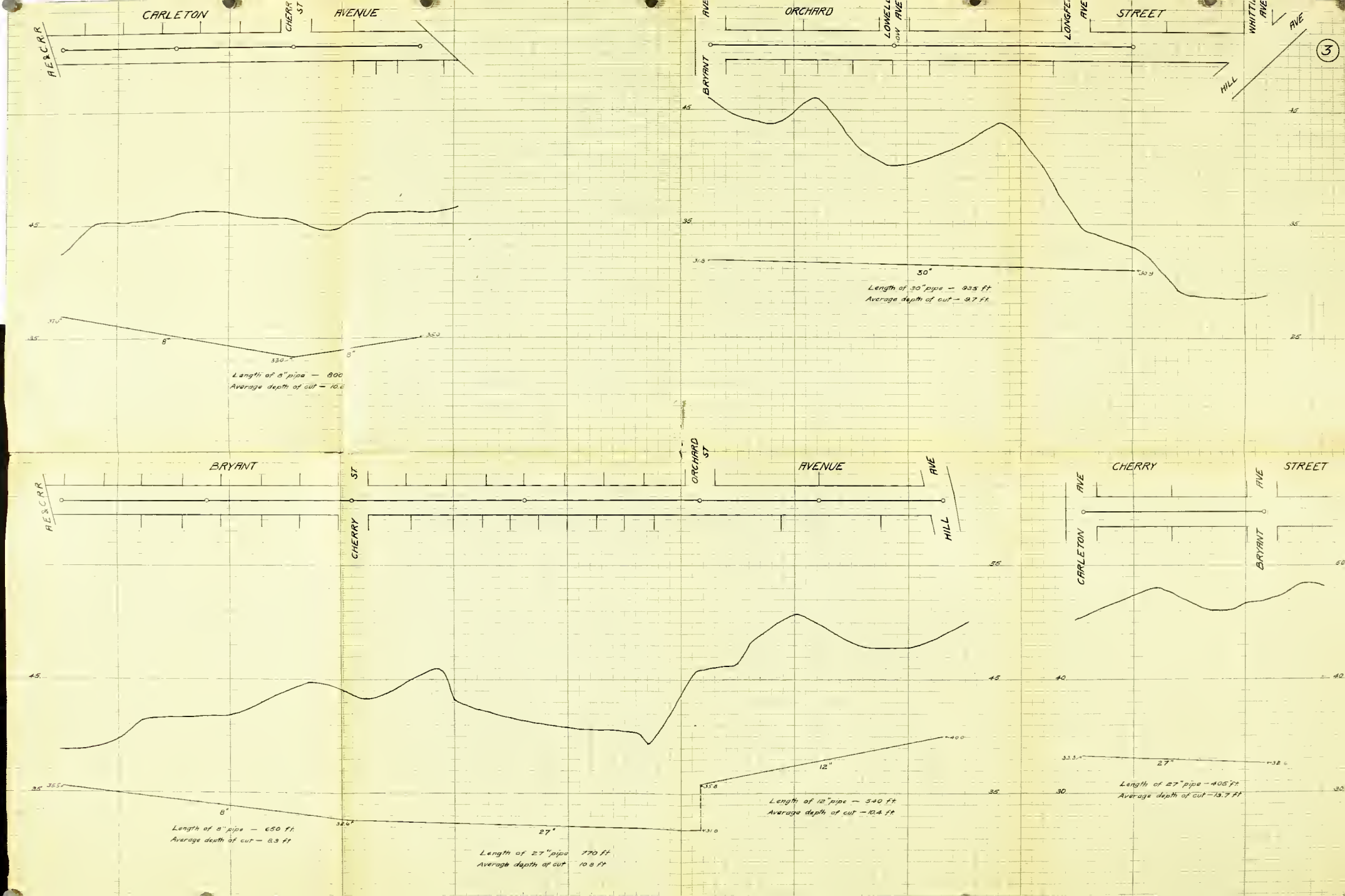
Line crossing Crescent Blvd. from Ellyn Ave. (East Branch) to Walnut & Taylor ..... PROFILE NO.22

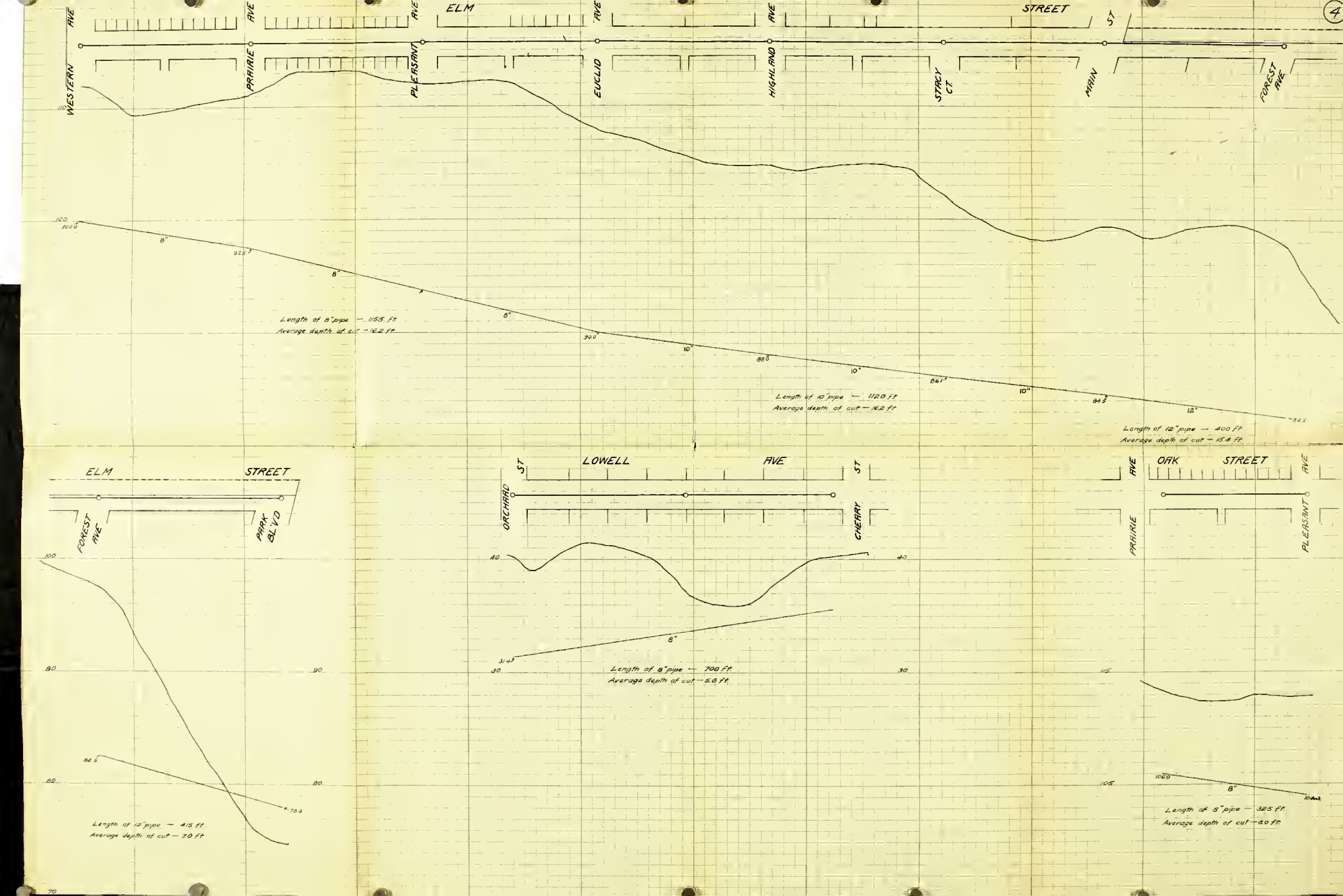
Line from Orchard to Hill, between Longfellow and Whittier ..... Profile no.29

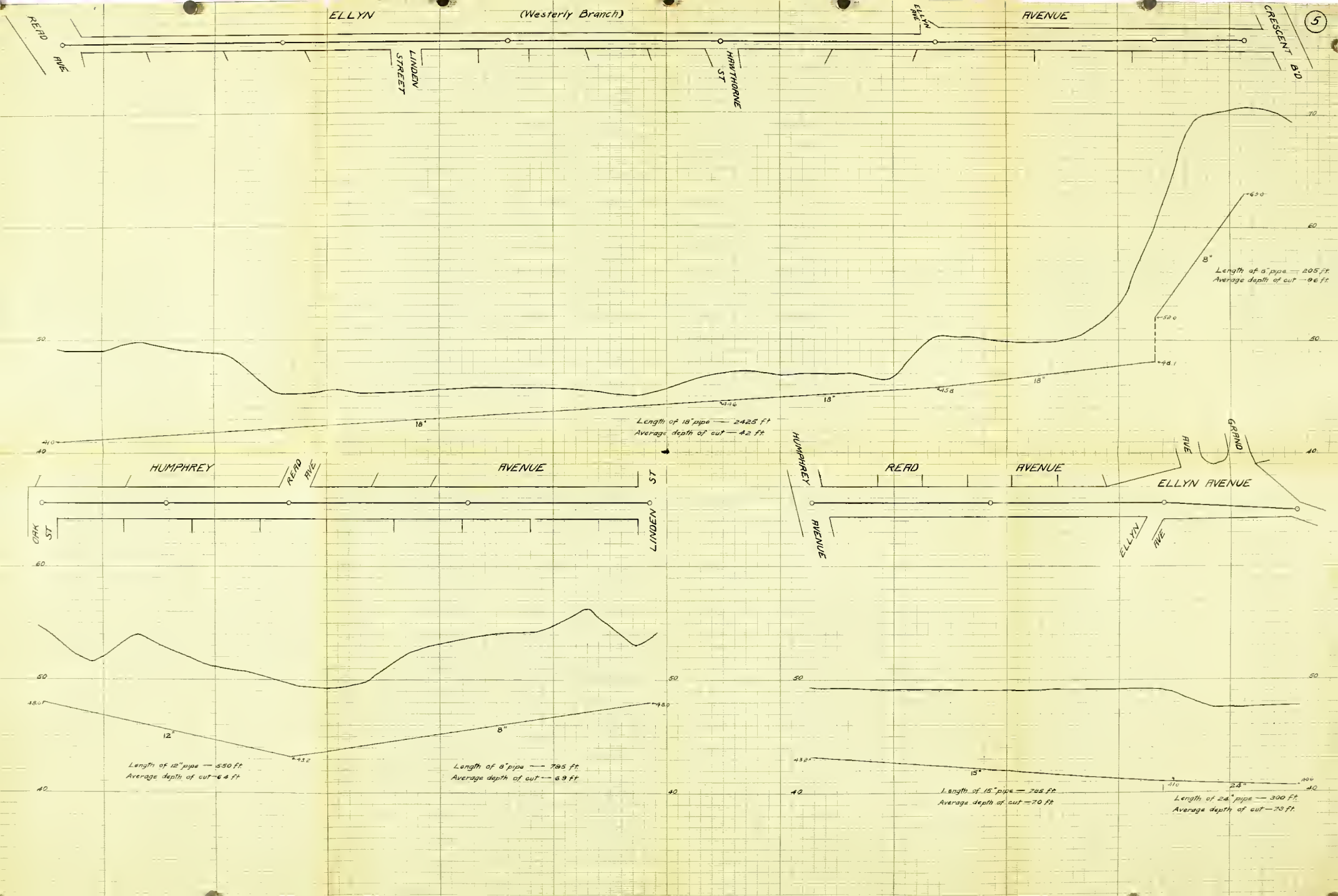
Line from Taylor to Carlton, between Duane and Cherry .... Profile no.29

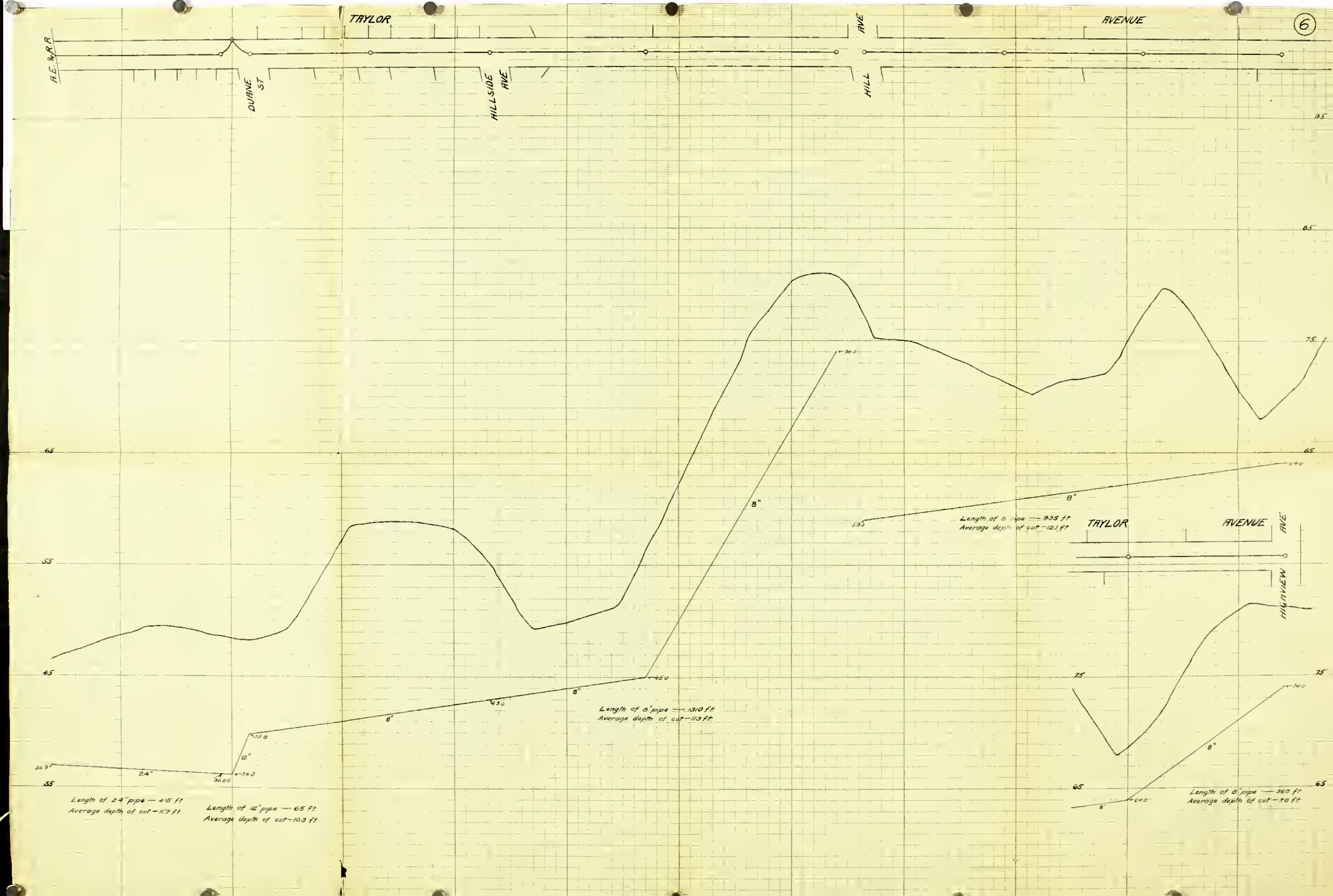

193' to E. & W. ℄ NW ¼ Sec. 13
Pipe Line 1610' W of N. & S. ℄ Sec. 13
AVE
HILL
15
45
35
30'
30"
1293
Length of Pipe — 1340 ft
Average depth of cut — 61 ft
25
N. & S. ℄ Sec. 13
Pipe Line 193' N. of E. & W. ℄ NW ¼ Sec. 13
45
35
23
30"
2895
Length of Pipe — 1610 ft.
Average depth of cut — 51 ft.
25

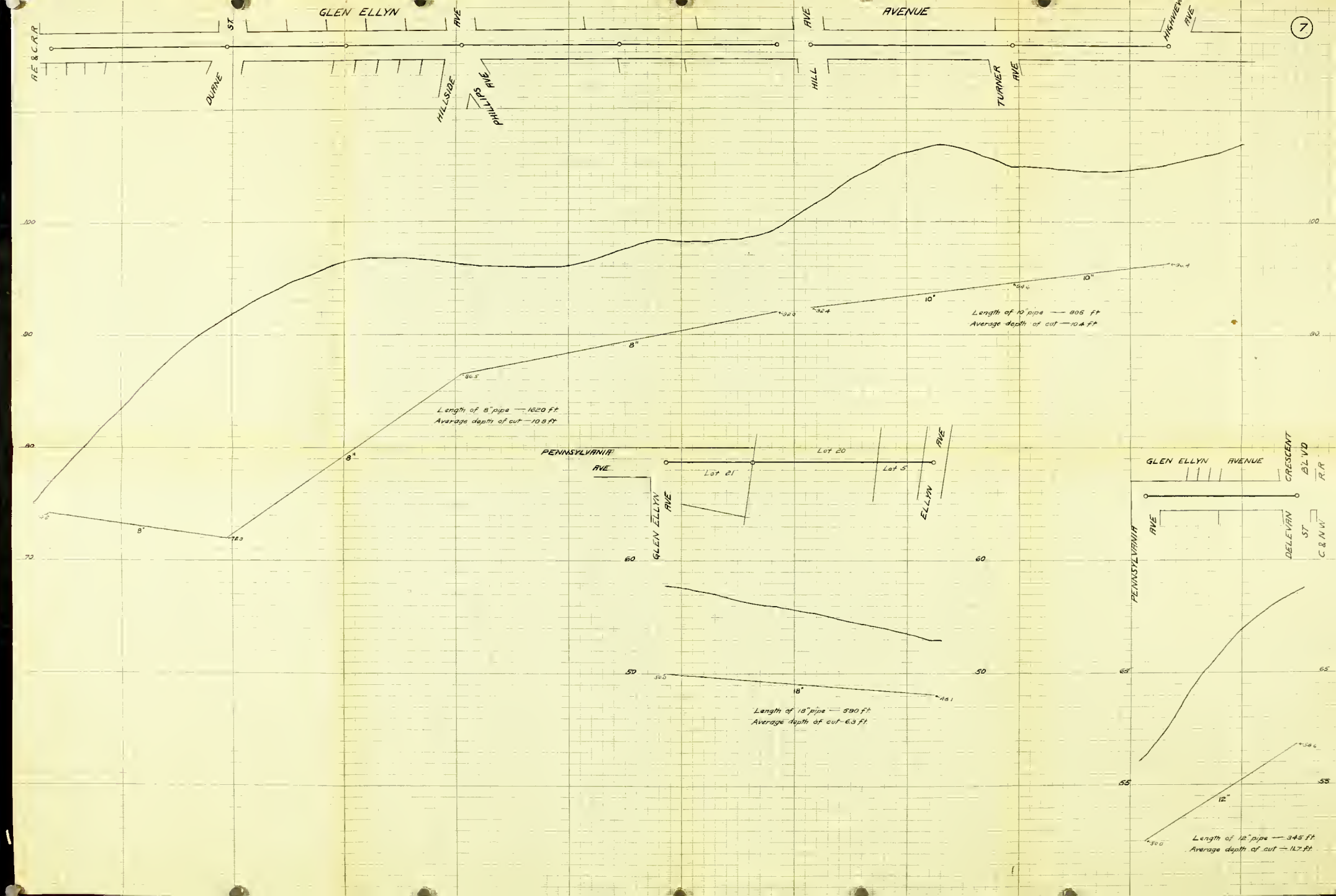

AVE
OAK
BLVD
STREET
FOREST
PARK
HUMPHREY AVE
90
80
70
60
50
79.5
8"
Length of 8" pipe = 405 ft
Average depth of cut = 5.7 ft
71.0
12"
Length of 12" pipe = 395 ft
Average depth of cut = 5.2 ft
48
HIGHLAND AVE
LINDEN
ST.
AVE
BLVD
STREET
HUMPHREY AVE
MAIN
FOREST
PARK
110
100
90
80
70
60
50
91.0
8"
96.0
8"
88.0
8"
86.0
Length of 8" pipe = 1610 ft
Average depth of cut = 11.6 ft
79.5
8"
62.0
8"
48.0

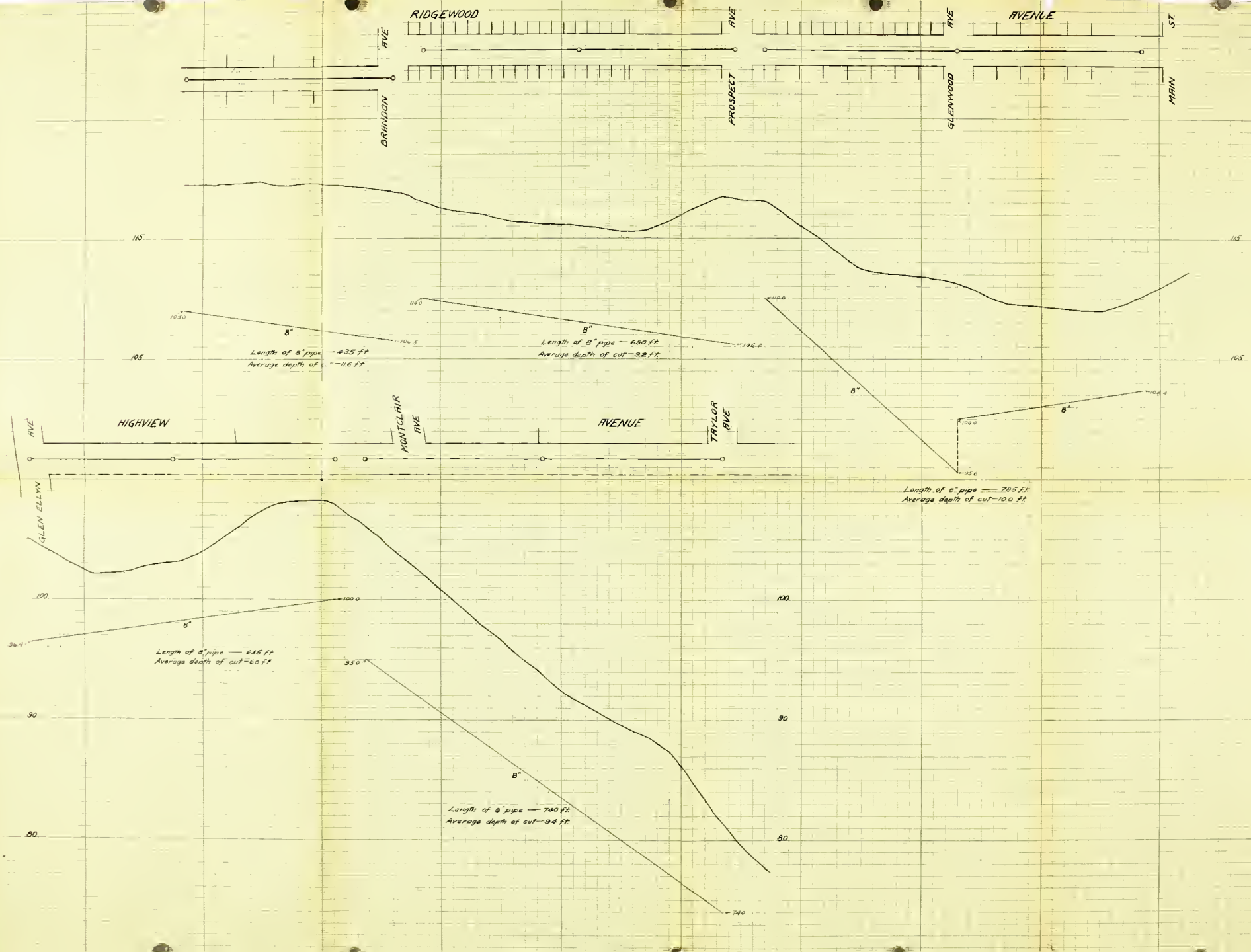

CARLETON
CHERRY ST
AVENUE
AE&CRR
ORCHARD
LOWELL AVE
LONGFELLOW AVE
STREET
WHITTIER AVE
BRYANT
HILL
AVE
3
45
35
25
30"
Length of 30" pipe — 935 ft
Average depth of cut — 9.7 ft
8"
Length of 8" pipe — 800
Average depth of cut — 10.6
BRYANT
ST
ORCHARD ST
AVENUE
AVE
CHERRY
HILL
55
45
35
8"
Length of 8" pipe — 650 ft
Average depth of cut — 8.3 ft
27"
Length of 27" pipe 770 ft
Average depth of cut 10.8 ft
12"
Length of 12" pipe — 540 ft
Average depth of cut — 10.4 ft
CHERRY
AVE
STREET
CARLETON
BRYANT
50
40
30
27"
Length of 27" pipe — 405 ft
Average depth of cut — 13.7 ft

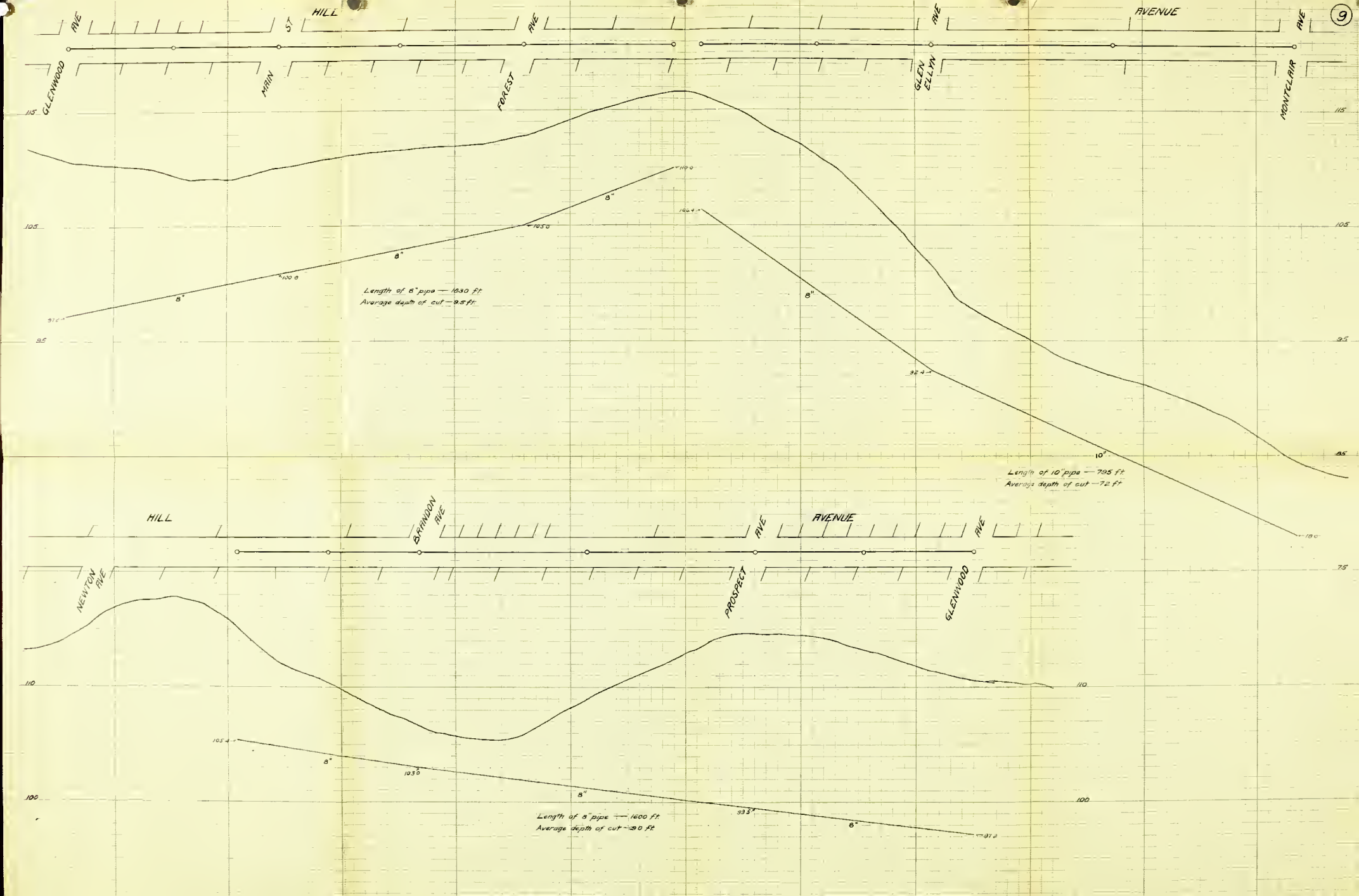

4
ELM STREET
WESTERN AVE
PRAIRIE AVE
PLEASANT AVE
EUCLID AVE
HIGHLAND AVE
STACY CT.
MAIN ST
FOREST AVE
Length of 8" pipe — 1155 ft
Average depth of cut — 16.2 ft
Length of 10" pipe — 1120 ft
Average depth of cut — 16.2 ft
Length of 12" pipe — 400 ft
Average depth of cut — 15.4 ft
ELM STREET
FOREST AVE
PARK BLVD
Length of 12" pipe — 415 ft
Average depth of cut — 7.0 ft
LOWELL AVE
ORCHARD ST
CHERRY ST
Length of 8" pipe — 700 ft
Average depth of cut — 5.8 ft
OAK STREET
PRAIRIE AVE
PLEASANT AVE
Length of 8" pipe — 325 ft
Average depth of cut — 8.0 ft

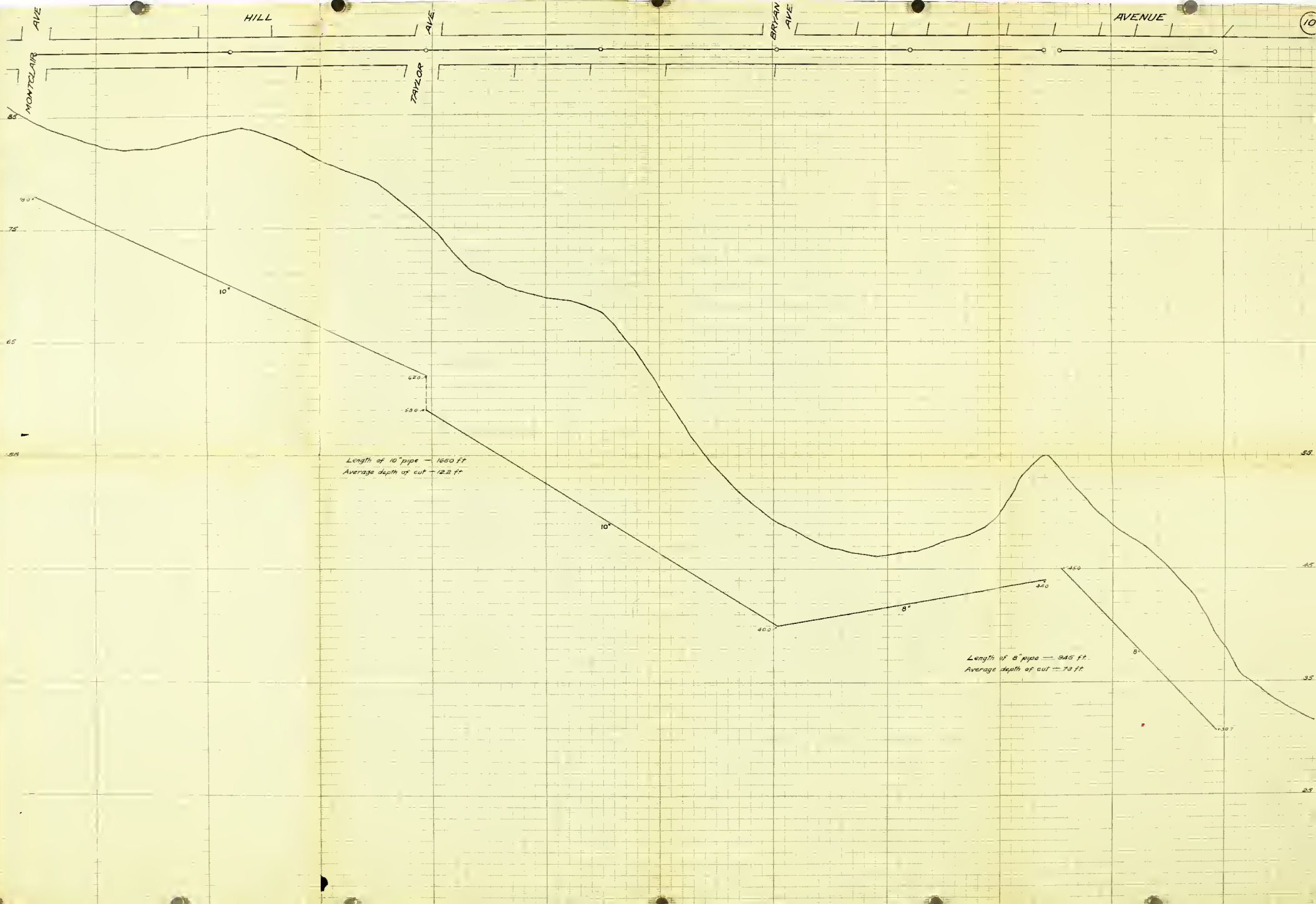

ELLYN (Westerly Branch) AVENUE
READ AVE
LINDEN STREET
HAWTHORNE ST
ELLYN AVE
CRESCENT B'D
70
60
50
40
8"
Length of 8" pipe — 205 ft.
Average depth of cut — 9.6 ft.
18"
Length of 18" pipe — 2425 ft
Average depth of cut — 4.2 ft.
HUMPHREY READ AVE AVENUE
OAK ST
LINDEN ST
12"
Length of 12" pipe — 550 ft.
Average depth of cut — 6.4 ft.
8"
Length of 8" pipe — 785 ft.
Average depth of cut — 6.9 ft.
HUMPHREY AVENUE
READ AVENUE
ELLYN AVE
GRAND AVE
ELLYN AVENUE
15"
Length of 15" pipe — 785 ft.
Average depth of cut — 7.0 ft.
24"
Length of 24" pipe — 300 ft.
Average depth of cut — 7.3 ft.

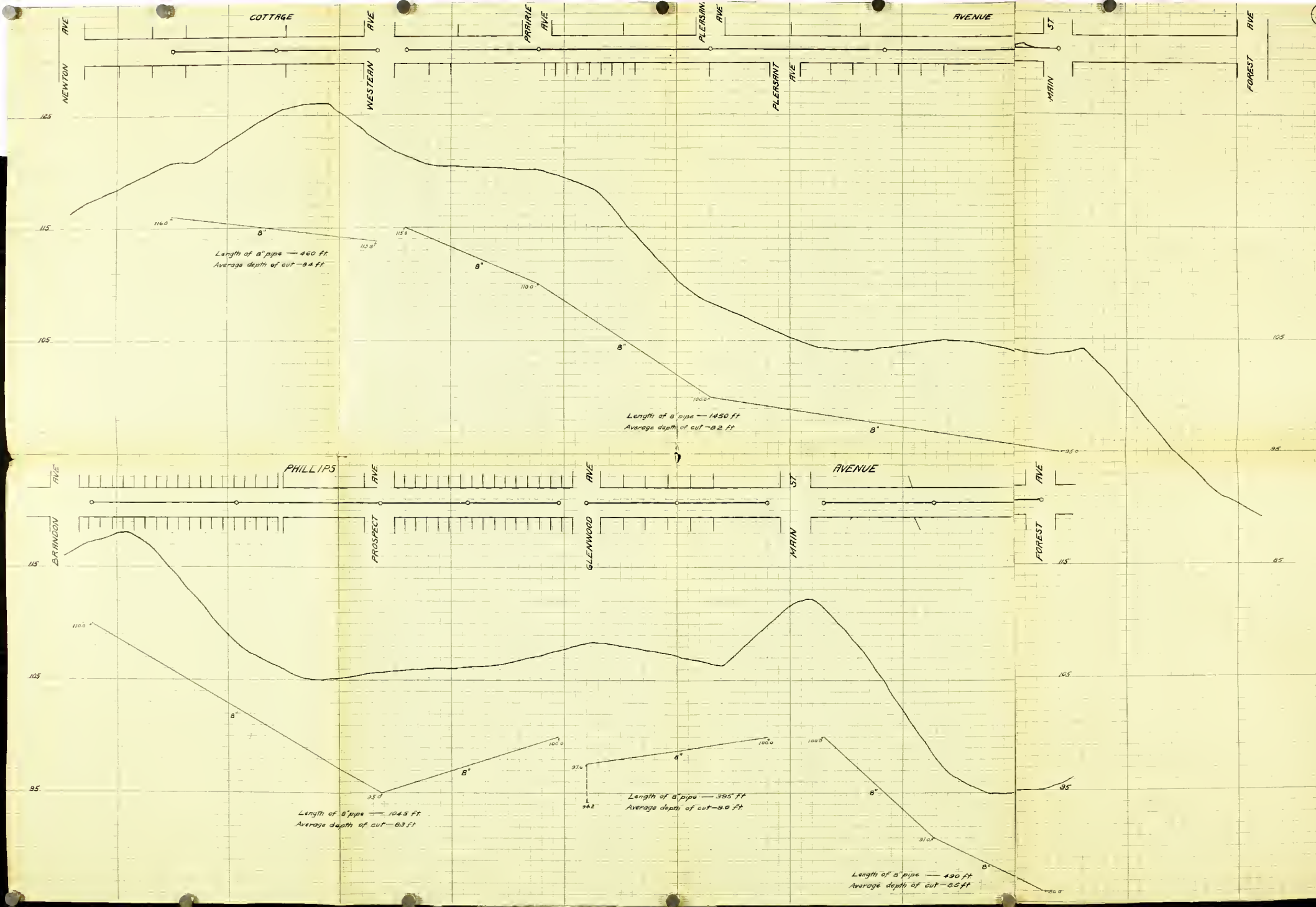

TAYLOR
AVE
AVENUE
A.E. & R.R.
DUBINE ST
HILLSIDE AVE
HILL
95
85
75
65
55
45
35
Length of 24" pipe — 415 ft
Average depth of cut — 11.7 ft
Length of 12" pipe — 65 ft.
Average depth of cut — 10.3 ft.
Length of 8" pipe — 1310 ft.
Average depth of cut — 11.5 ft.
Length of 8" pipe — 935 ft
Average depth of cut — 12.1 ft
TAYLOR
AVENUE
AVE
HIGHVIEW
Length of 8" pipe — 360 ft
Average depth of cut — 7.8 ft

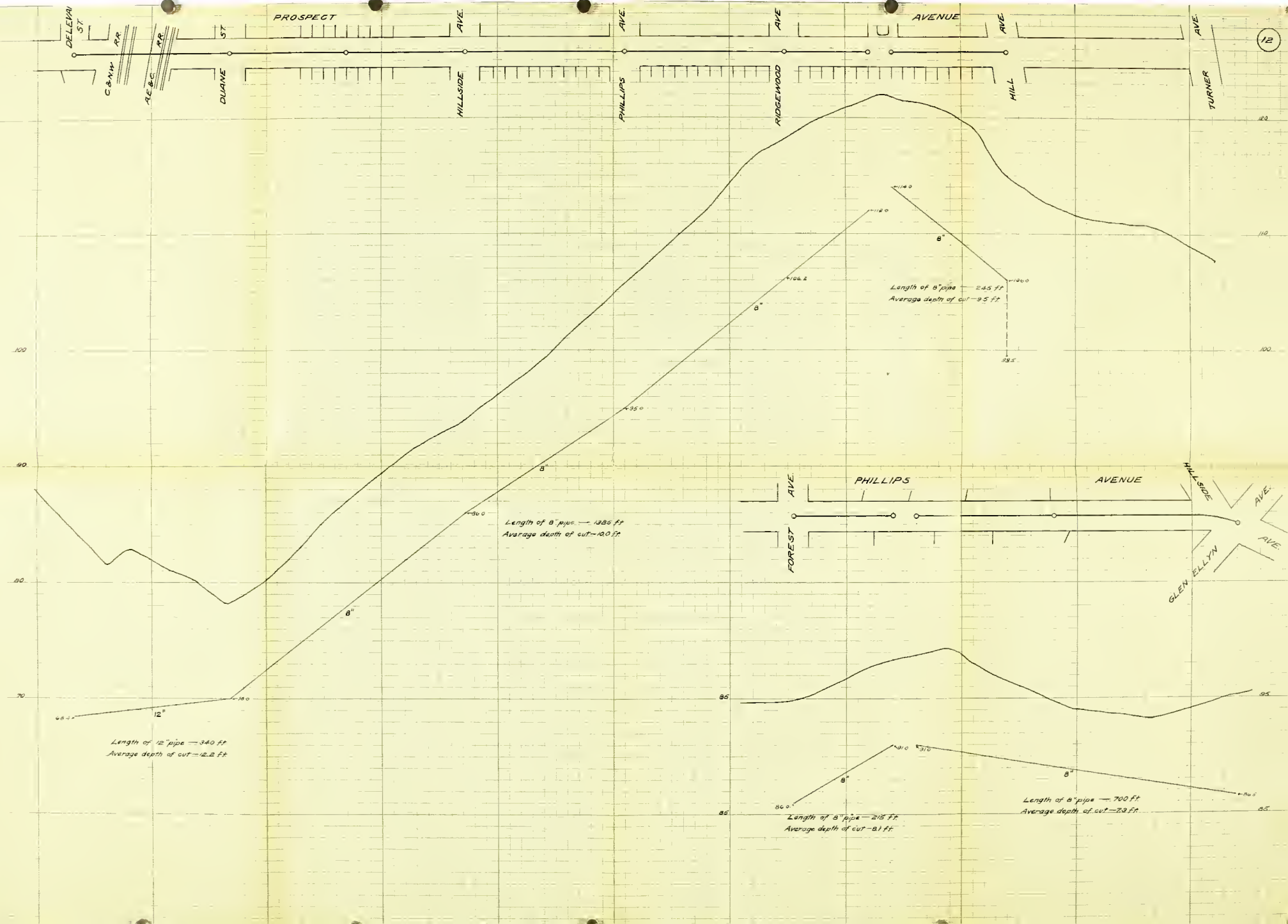

GLEN ELLYN AVE
AVENUE
HIGHVIEW AVE
A.E. & C.R.R.
DURNE ST
HILLSIDE AVE
PHILLIPS AVE
HILL AVE
TURNER AVE
100
90
80
70
60
50
65
55
8"
10"
18"
12"
Length of 8" pipe — 1620 ft.
Average depth of cut — 10.8 ft.
Length of 10" pipe — 806 ft.
Average depth of cut — 10.4 ft.
Length of 18" pipe — 590 ft.
Average depth of cut — 6.3 ft.
Length of 12" pipe — 345 ft.
Average depth of cut — 11.7 ft.
PENNSYLVANIA AVE
GLEN ELLYN AVE
Lot 20
Lot 21
Lot 5
ELLYN AVE
GLEN ELLYN AVENUE
CRESCENT
B.L.V.D.
R.R.
PENNSYLVANIA AVE
DELEVAN ST
C.&N.W.

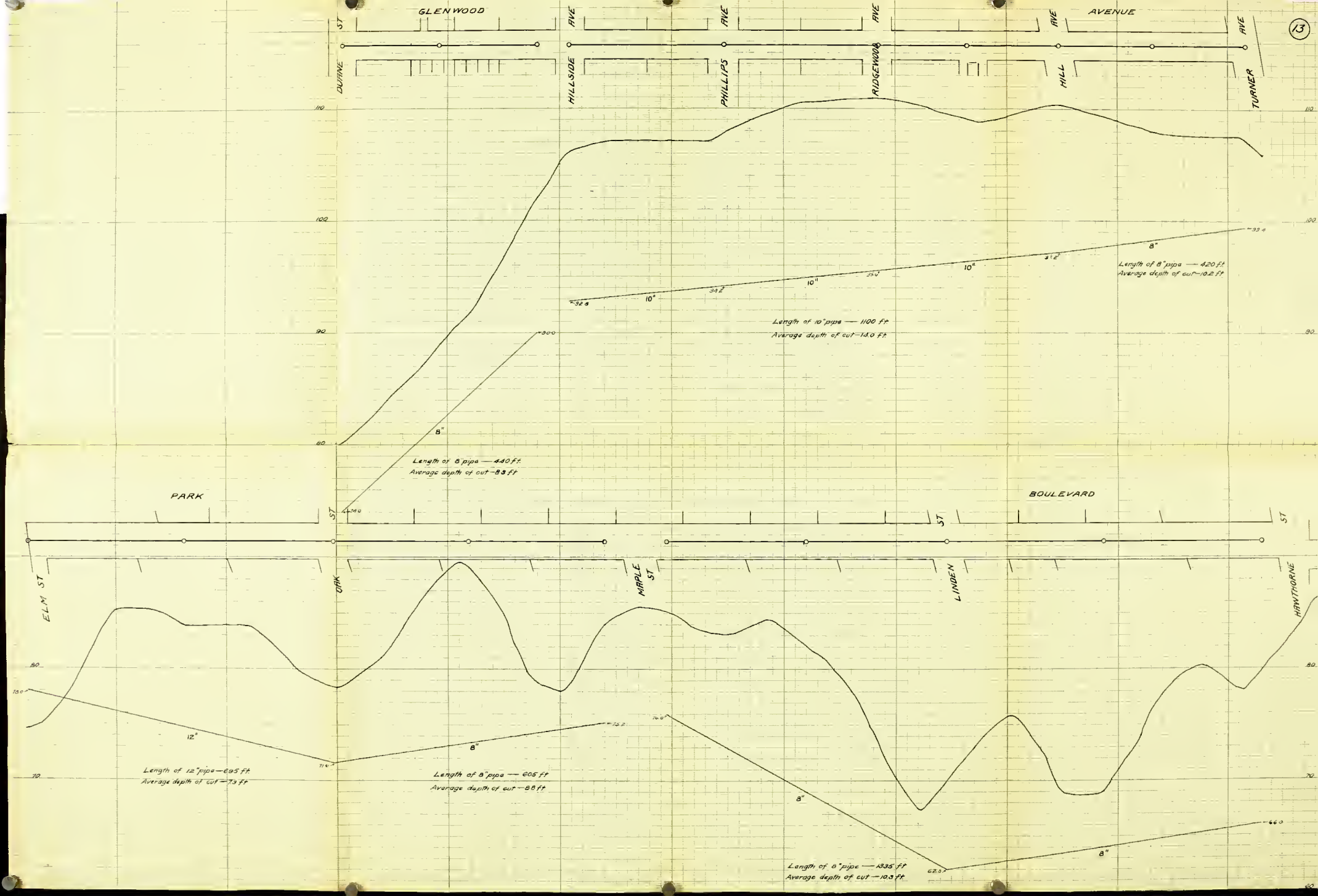

RIDGEWOOD
AVE
AVE
AVENUE
ST.
AVE
BRANDON
PROSPECT
GLENWOOD
MAIN
115
105
100
90
80
8"
Length of 8" pipe — 435 ft
Average depth of cut — 11.6 ft
8"
Length of 8" pipe — 650 ft.
Average depth of cut — 9.2 ft.
8"
Length of 8" pipe — 785 ft.
Average depth of cut — 10.0 ft.
HIGHVIEW
AVE
MONTCLAIR
AVE
AVENUE
TAYLOR
AVE
GLEN ELYN
8"
Length of 8" pipe — 645 ft
Average depth of cut — 6.8 ft.
8"
Length of 8" pipe — 740 ft.
Average depth of cut — 9.4 ft.

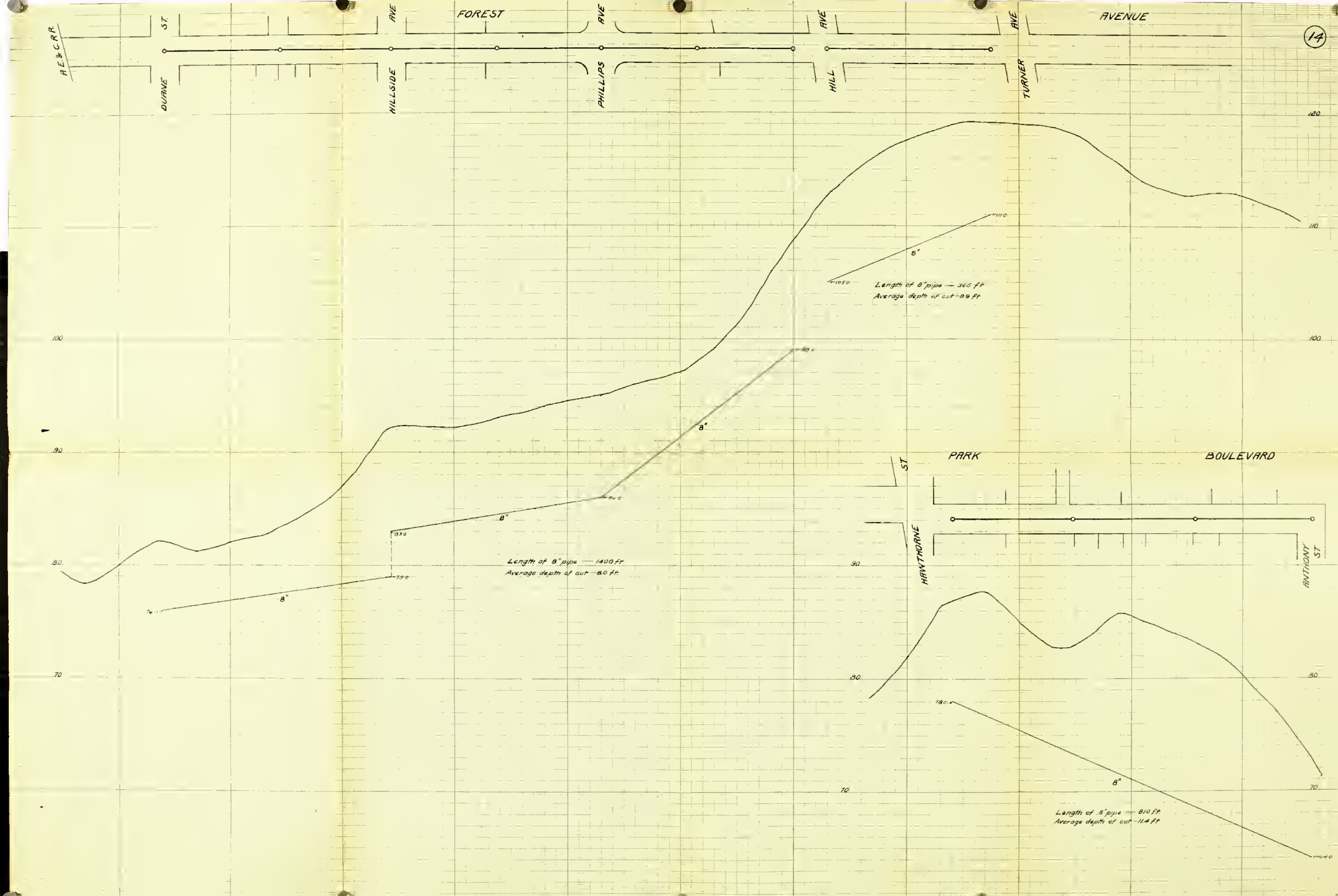

HILL
AVE
ST
AVE
AVE
AVENUE
AVE
GLENWOOD
MAIN
FOREST
GLEN ELLYN
MONTCLAIR
115
105
95
85
75
110
100
110.0
105.0
100.0
91.0
8"
8"
8"
Length of 8" pipe — 1030 ft.
Average depth of cut — 9.5 ft.
104.4
92.4
8"
10"
Length of 10" pipe — 795 ft.
Average depth of cut — 7.2 ft.
118.0
HILL
BRANDON AVE
AVE
AVENUE
AVE
NEWTON AVE
PROSPECT
GLENWOOD
105.4
103.0
8"
8"
99.5
8"
91.2
Length of 8" pipe — 1600 ft.
Average depth of cut — 8.0 ft.

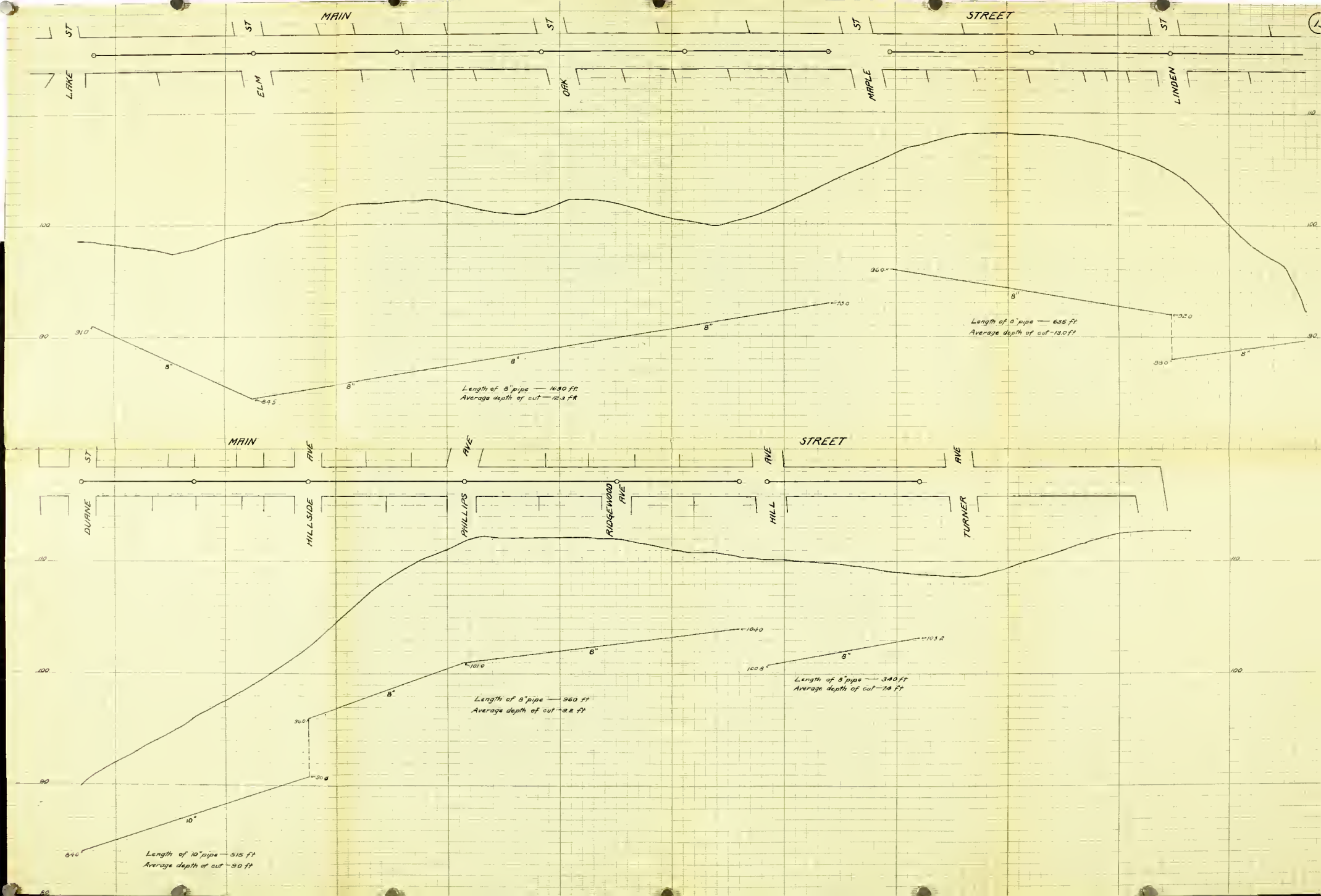

AVE
HILL
AVE
BRYAN
AVE
AVENUE
10
MONTCLAIR
TAYLOR
85
75
65
55
55
45
35
25
10"
620
530
Length of 10" pipe — 1650 ft
Average depth of cut — 12.2 ft
10"
400
8"
420
450
8"
Length of 8" pipe — 945 ft.
Average depth of cut — 7.3 ft
307

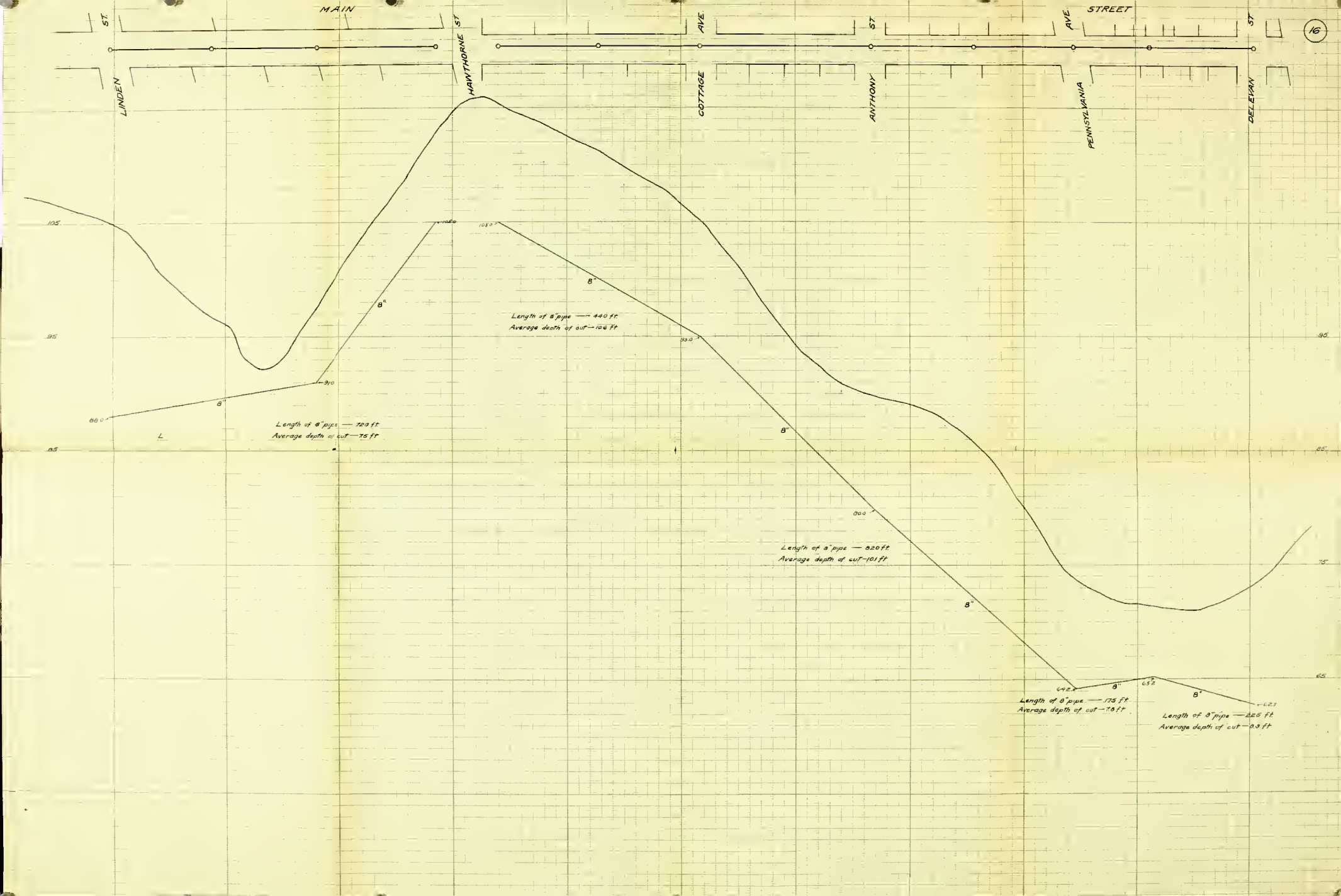

COTTAGE AVE
PRAIRIE AVE
PLEASANT AVE
AVENUE ST
NEWTON AVE
WESTERN AVE
PLEASANT AVE
MAIN ST
FOREST AVE
125
115
105
95
1160
1135
8"
Length of 8" pipe — 460 ft.
Average depth of cut — 8.4 ft.
1150
1100
1000
950
Length of 8" pipe — 1450 ft.
Average depth of cut — 8.2 ft.
PHILLIPS AVE
AVENUE ST
BRANDON AVE
PROSPECT AVE
GLENWOOD AVE
MAIN ST
FOREST AVE
85
1100
950
1000
Length of 8" pipe — 1045 ft.
Average depth of cut — 8.3 ft.
914
942
Length of 8" pipe — 395 ft.
Average depth of cut — 9.0 ft.
910
860
Length of 8" pipe — 490 ft.
Average depth of cut — 8.5 ft.

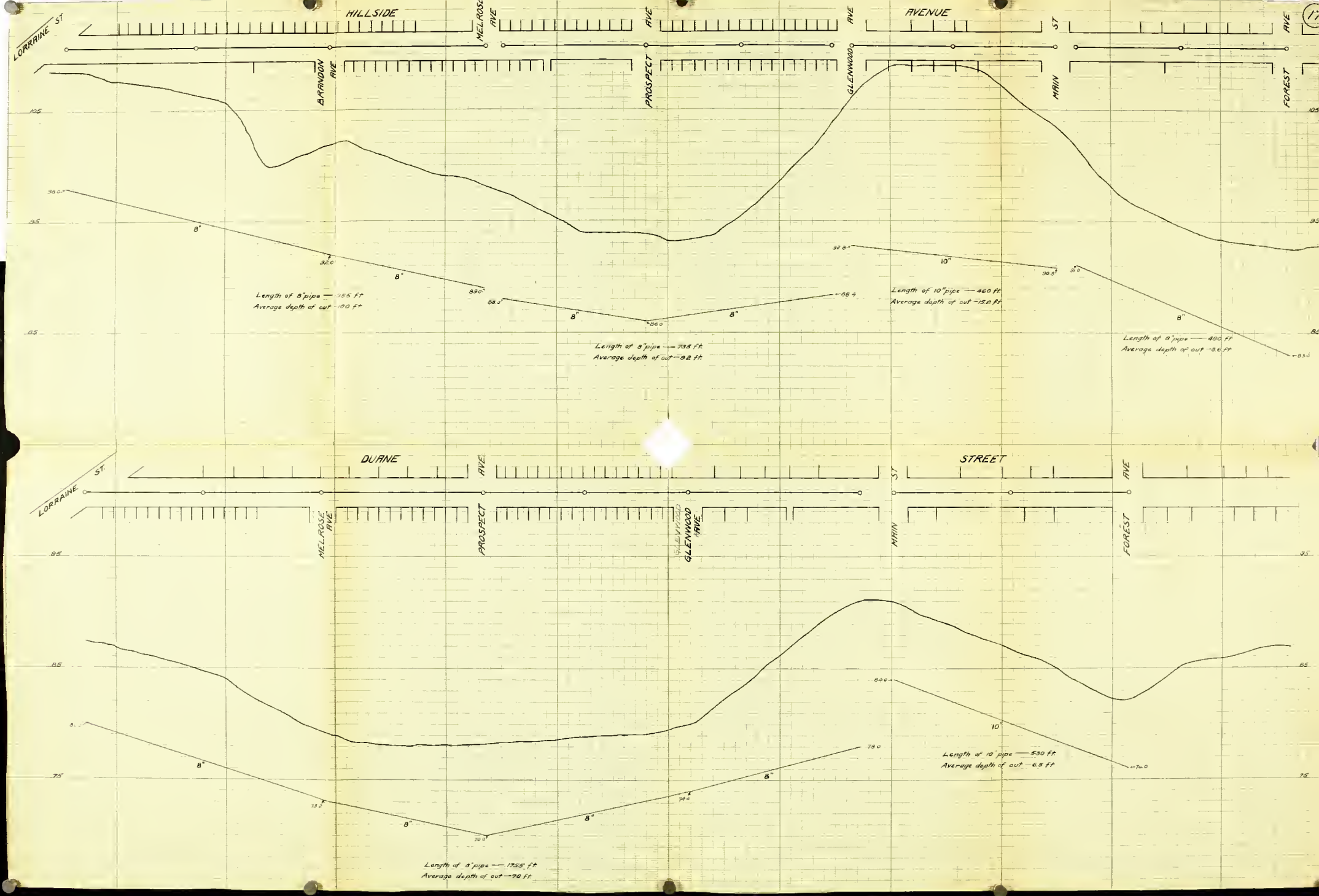

12
DELEWARE ST
C&NW RR
A&C RR
PROSPECT
ST
AVE.
AVE.
AVE
AVENUE
AVE.
AVE.
DUANE
HILLSIDE
PHILLIPS
RIDGEWOOD
HILL
TURNER
120
110
100
90
80
70
Length of 8" pipe — 245 ft
Average depth of cut — 9.5 ft
Length of 8" pipe — 1985 ft
Average depth of cut — 10.0 ft
Length of 12" pipe — 340 ft
Average depth of cut — 12.2 ft
PHILLIPS
AVENUE
HILLSIDE
AVE.
AVE.
AVE.
FOREST
GLEN ELLYN
95
85
Length of 8" pipe — 215 ft
Average depth of cut — 8.1 ft
Length of 8" pipe — 700 ft
Average depth of cut — 7.3 ft

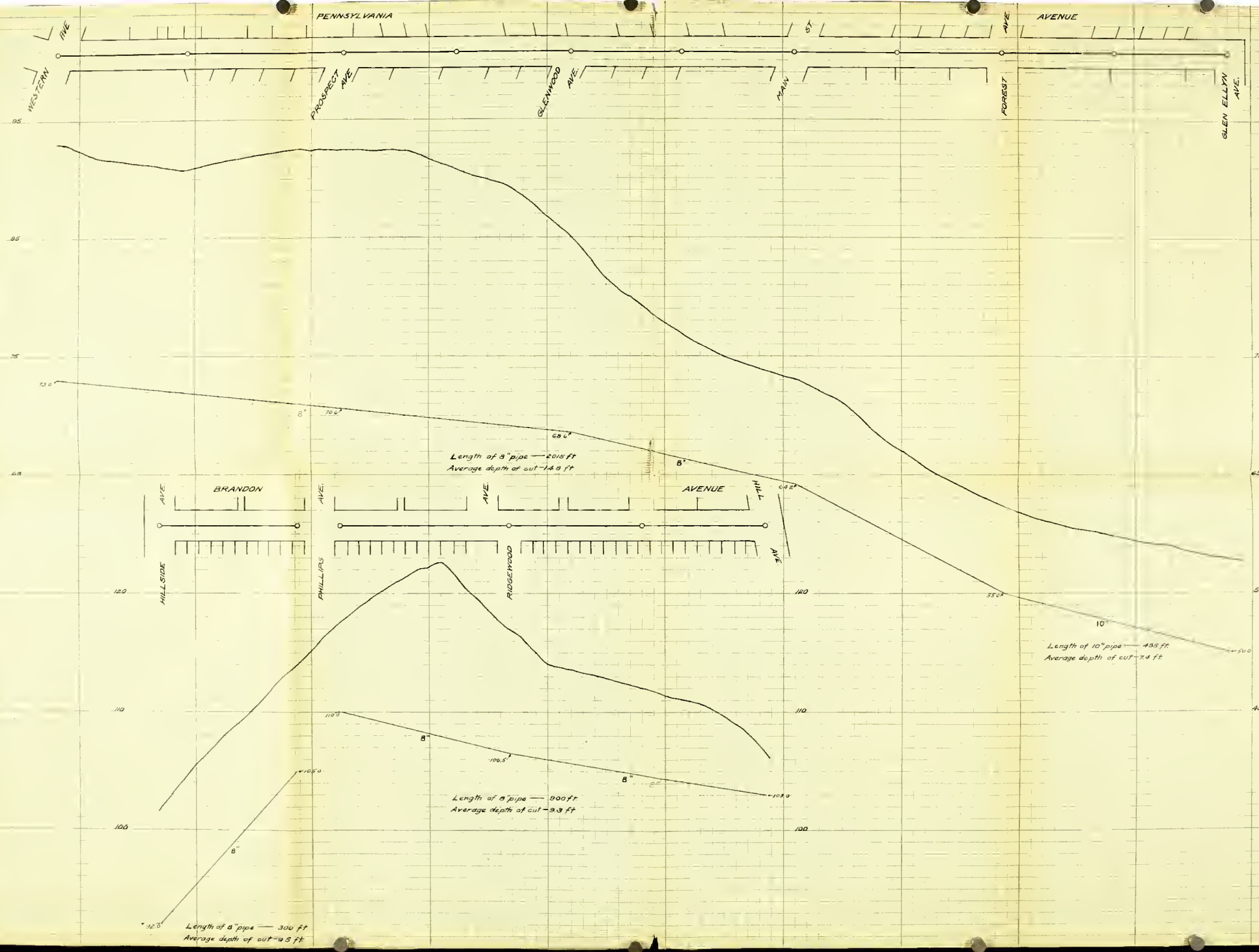

GLENWOOD
ST
AVE
AVE
AVE
AVE
AVENUE
AVE
DUFINE
HILLSIDE
PHILLIPS
RIDGEWOOD
HILL
TURNER
110
100
90
80
Length of 10" pipe — 1100 ft.
Average depth of cut — 14.0 ft.
Length of 8" pipe — 420 ft.
Average depth of cut — 10.2 ft.
Length of 8" pipe — 440 ft.
Average depth of cut — 8.3 ft.
PARK
ST
BOULEVARD
ST
ST
ELM ST
OAK
MAPLE ST
LINDEN
HAWTHORNE
80
70
Length of 12" pipe — 695 ft.
Average depth of cut — 7.3 ft.
Length of 8" pipe — 605 ft.
Average depth of cut — 8.8 ft.
Length of 8" pipe — 1335 ft.
Average depth of cut — 10.3 ft.

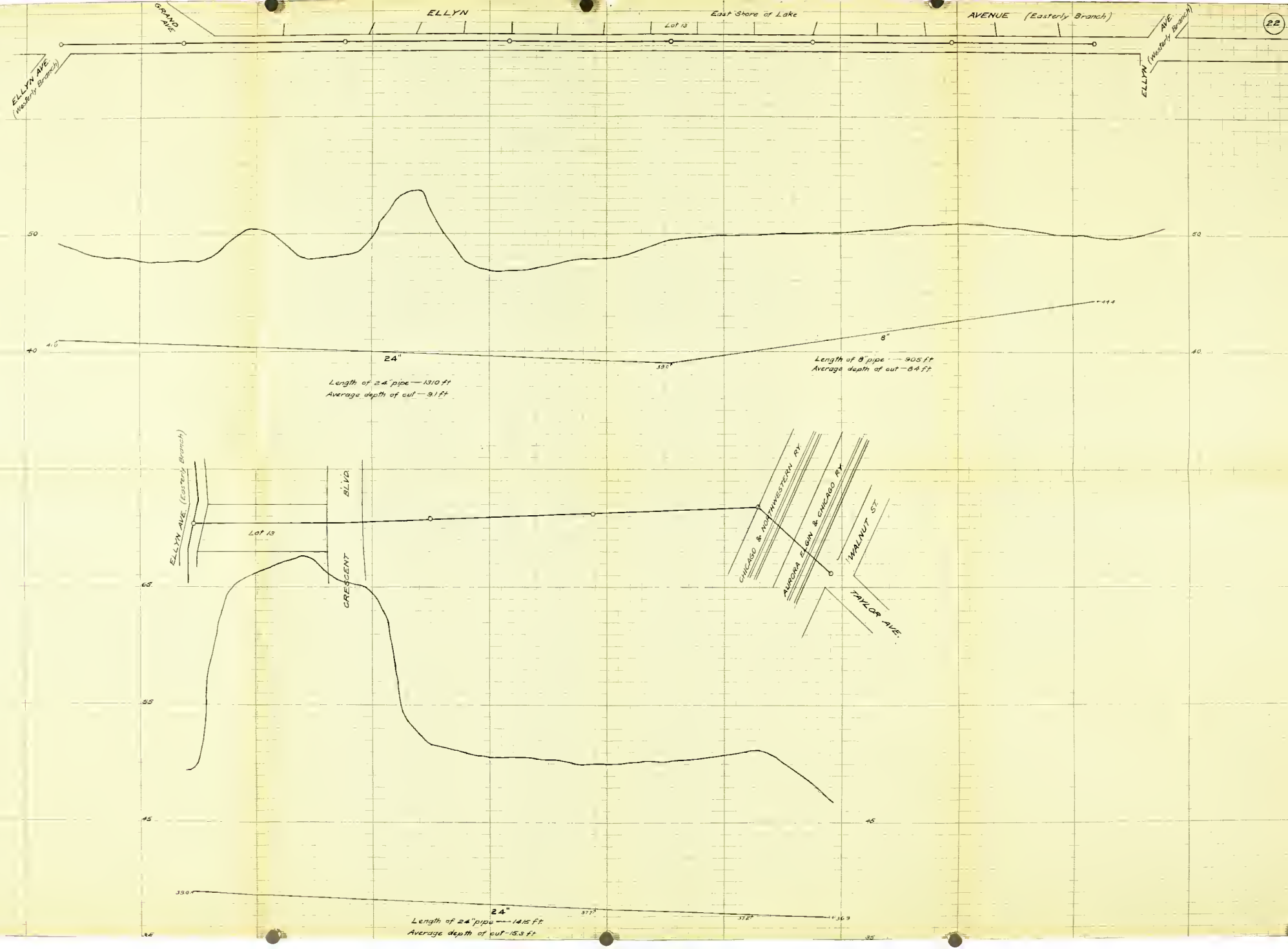

A.E.&C.R.R.
DURANE ST.
HILLSIDE AVE
FOREST
PHILLIPS AVE
HILL AVE
TURNER AVE
AVENUE
120
110
100
90
80
70
1110
1050
8"
Length of 8" pipe — 365 ft.
Average depth of cut — 8.9 ft.
990
900
890
790
780
8"
Length of 8" pipe — 1400 ft.
Average depth of cut — 8.0 ft.
HAWTHORNE ST.
PARK
BOULEVARD
ANTHONY ST.
780
8"
Length of 8" pipe — 810 ft.
Average depth of cut — 11.4 ft.

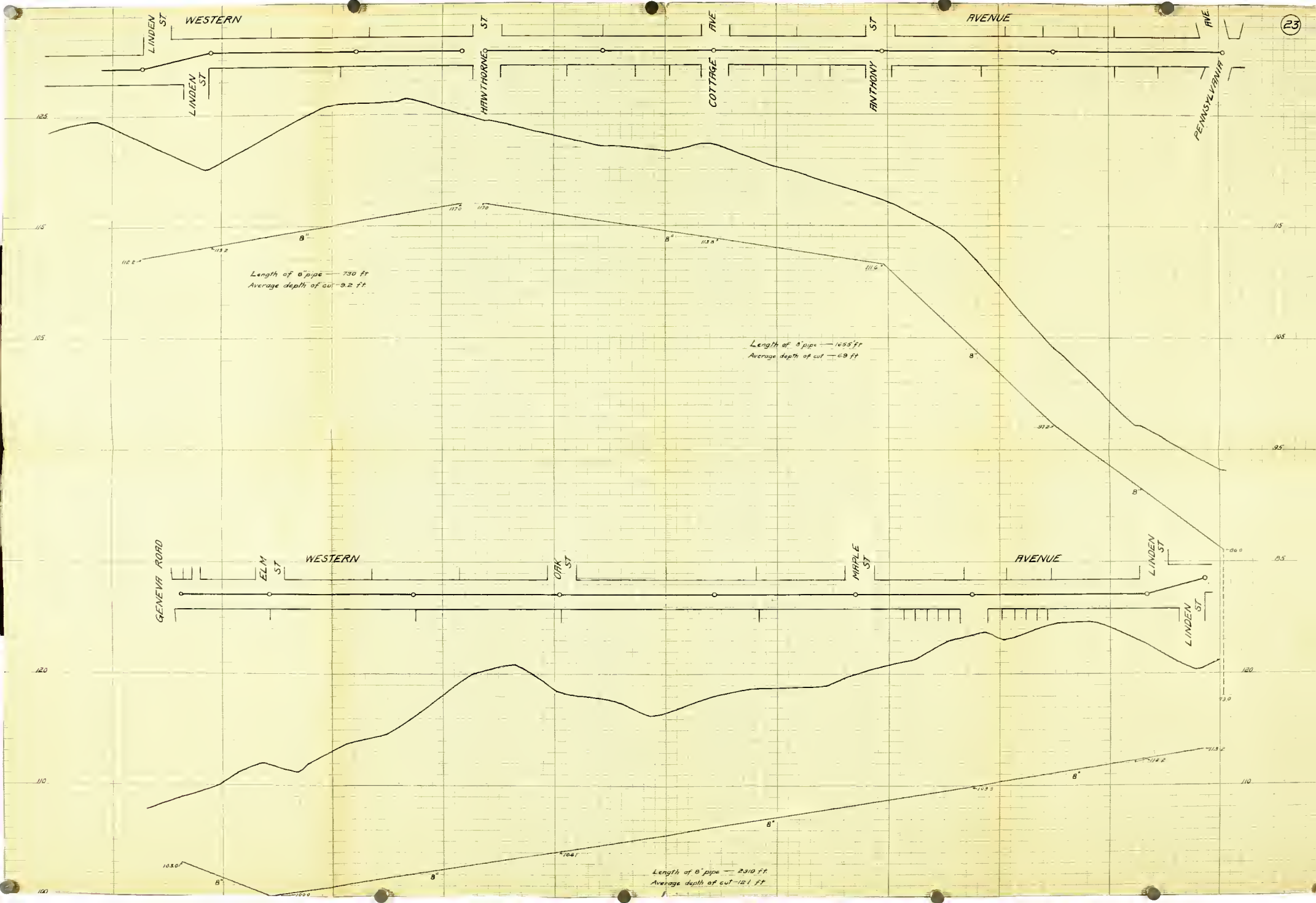

MAIN ST
STREET
LAKE
ELM
OAK
MAPLE
LINDEN
910
845
1030
960
920
830
8"
Length of 8" pipe — 1630 ft.
Average depth of cut — 12.3 ft
Length of 8" pipe — 635 ft
Average depth of cut - 13.0 ft
MAIN ST
AVE
STREET
DURANE
HILLSIDE
PHILLIPS
RIDGEWOOD AVE
HILL
TURNER
1040
1010
1008
1032
960
908
840
10"
Length of 8" pipe — 960 ft
Average depth of cut - 3.2 ft
Length of 8" pipe — 340 ft
Average depth of cut - 7.4 ft
Length of 10" pipe — 515 ft
Average depth of cut - 9.0 ft
110
100
90
80

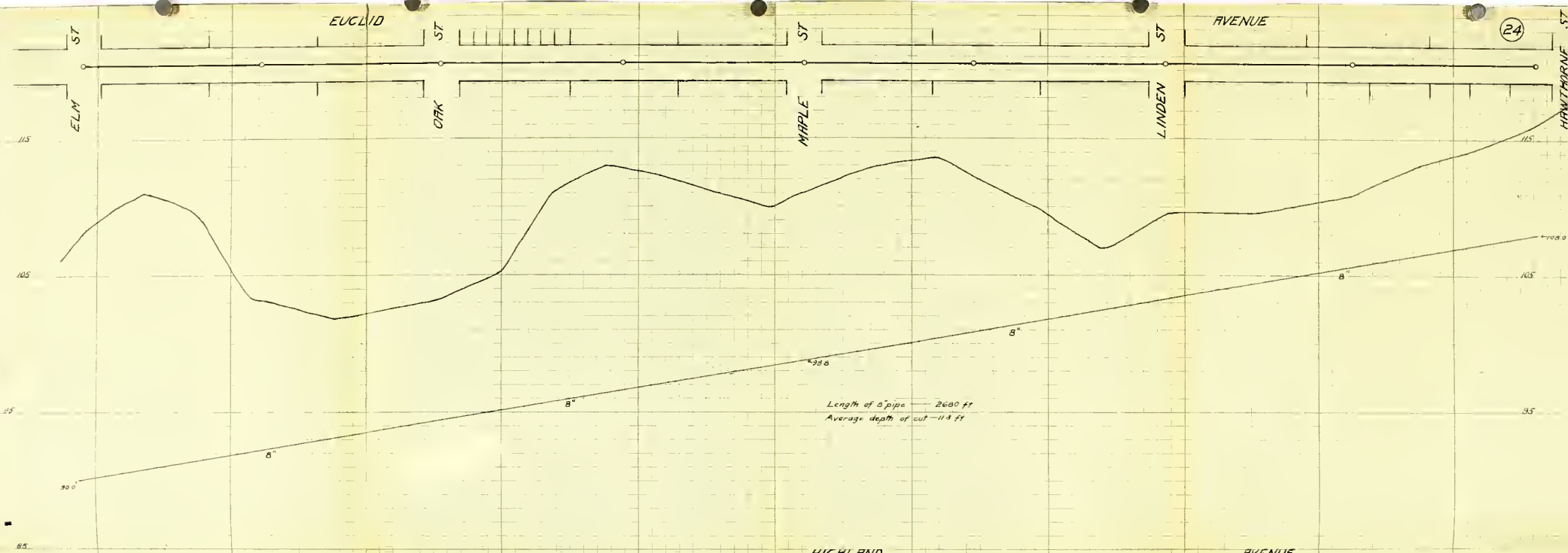

16
MAIN ST.
HAWTHORNE ST.
COTTAGE AVE.
ANTHONY ST.
PENNSYLVANIA AVE.
DELEVAN STREET
LINDEN
105
95
85
75
65
8"
Length of 8" pipe — 720 ft.
Average depth of cut — 7.5 ft
Length of 8" pipe — 440 ft.
Average depth of cut — 13.6 ft
Length of 8" pipe — 820 ft
Average depth of cut — 10.1 ft
Length of 8" pipe — 175 ft
Average depth of cut — 7.8 ft
Length of 8" pipe — 225 ft
Average depth of cut — 9.3 ft

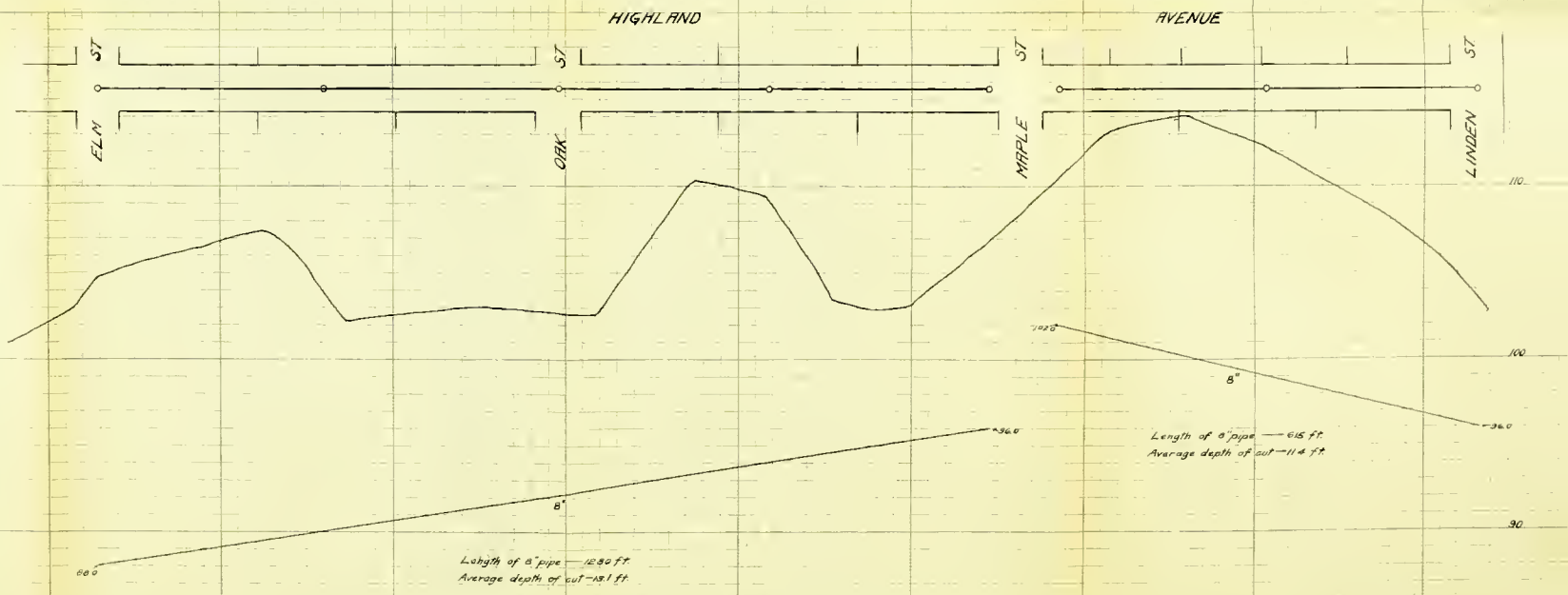

HILLSIDE
AVENUE
LORRAINE ST
BRANDON AVE
MELROSE AVE
PROSPECT AVE
GLENWOOD AVE
MAIN ST
FOREST AVE
105
95
85
98.0
92.0
89.0
8"
8"
Length of 8" pipe — 1355 ft
Average depth of out — 10.0 ft
88.5
86.0
88.4
8"
8"
Length of 8" pipe — 735 ft
Average depth of out — 9.2 ft
92.8
90.8
10"
Length of 10" pipe — 460 ft
Average depth of out — 15.8 ft
8"
Length of 8" pipe — 480 ft
Average depth of out — 8.6 ft
DUFINE
STREET
LORRAINE ST.
MELROSE AVE
PROSPECT AVE
GLENWOOD AVE
MAIN ST
FOREST AVE
95
85
75
8"
73.5
70.0
8"
8"
74.0
78.0
8"
Length of 8" pipe — 1755 ft
Average depth of out — 7.0 ft
84.0
10
Length of 10" pipe — 530 ft
Average depth of out — 6.5 ft
74.0

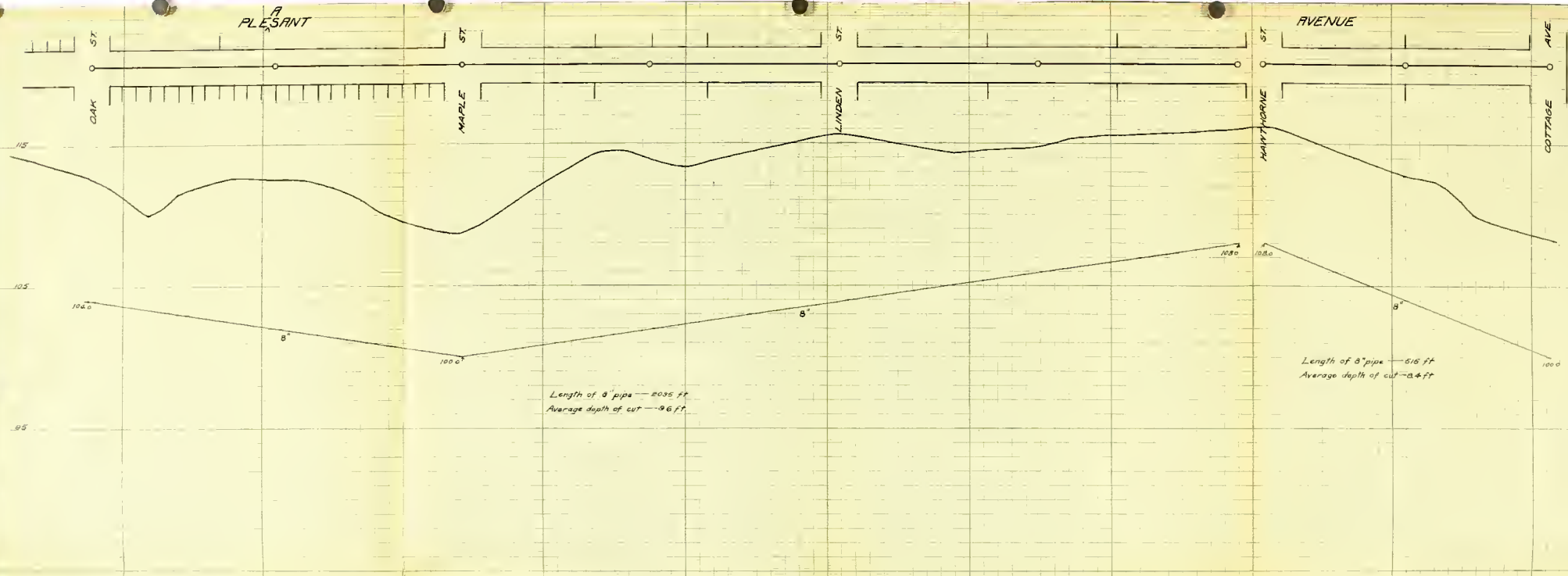

PENNSYLVANIA AVE
WESTERN AVE.
PROSPECT AVE.
GLENWOOD AVE.
MAIN ST.
FOREST AVE.
GLEN ELLYN AVE.
AVENUE
95
85
75
65
55
45
73.0
70.6
68.0
64.2
55.0
50.0
8"
10"
Length of 8" pipe — 2015 ft
Average depth of cut — 14.8 ft
Length of 10" pipe — 485 ft.
Average depth of cut — 7.4 ft
BRANDON AVE.
HILLSIDE AVE.
PHILLIPS AVE.
RIDGEWOOD AVE.
HILL AVE.
120
110
100
110.0
106.5
105.0
103.0
92.0
Length of 8" pipe — 900 ft.
Average depth of cut — 9.3 ft
Length of 8" pipe — 300 ft
Average depth of cut — 9.5 ft

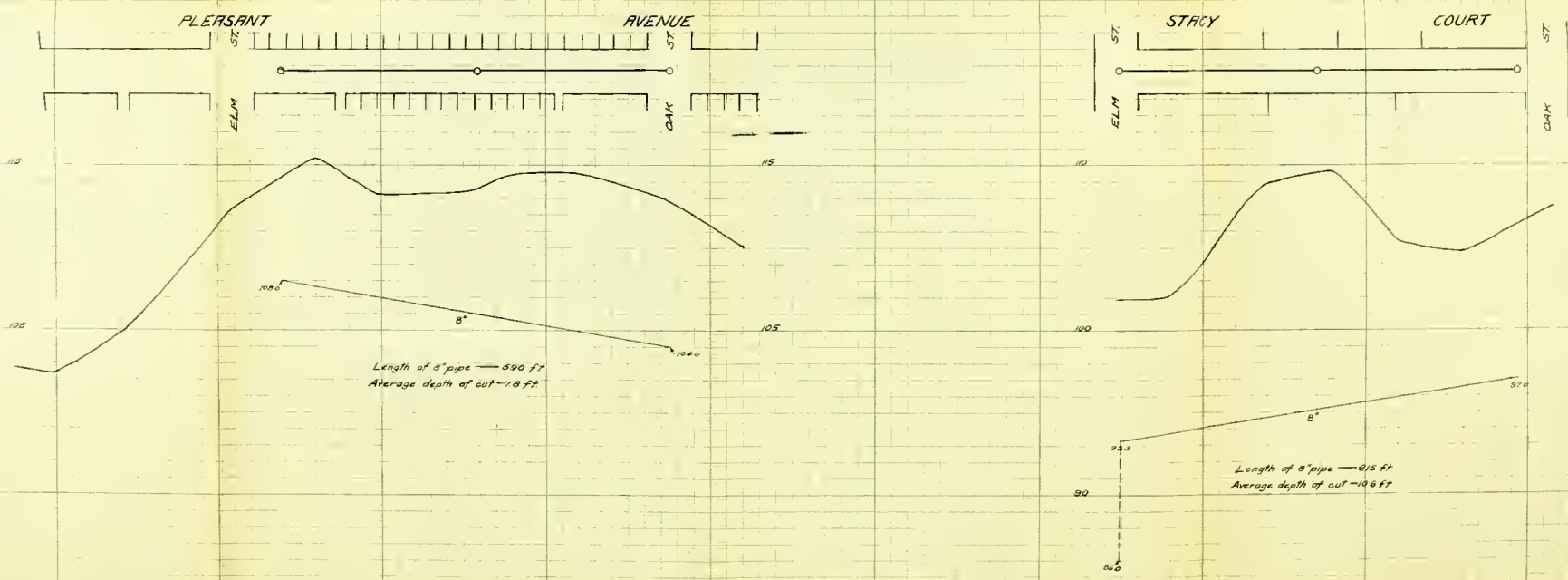

GRAND AVE.
ELLYN
East Shore of Lake
Lot 13
AVENUE (Easterly Branch)
ELLYN AVE. (Westerly Branch)
ELLYN AVE. (Westerly Branch)
50
40
24"
8"
Length of 24" pipe — 1310 ft
Average depth of cut — 9.1 ft
Length of 8" pipe — 905 ft
Average depth of cut — 6.4 ft
ELLYN AVE. (Easterly Branch)
Lot 13
BLVD.
CRESCENT
CHICAGO & NORTHWESTERN RY.
AURORA ELGIN & CHICAGO RY.
WALNUT ST.
TAYLOR AVE.
65
55
45
35
24"
Length of 24" pipe — 1415 ft.
Average depth of cut - 15.3 ft.

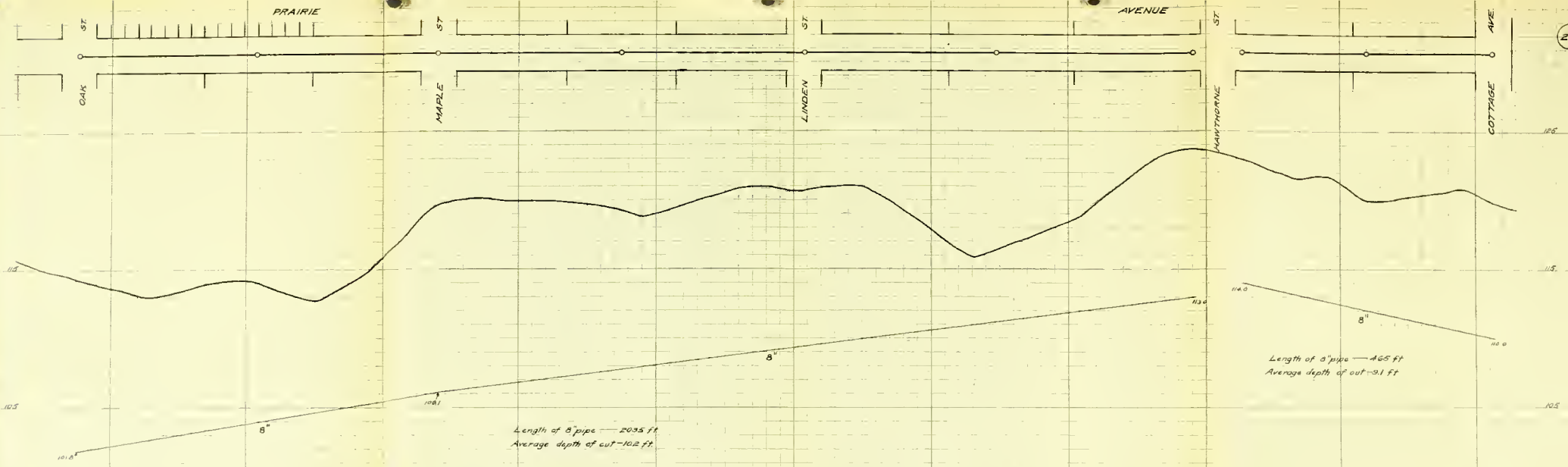

LINDEN ST
WESTERN
ST
AVE
ST
AVENUE
AVE
LINDEN ST
HAWTHORNE
COTTAGE
ANTHONY
PENNSYLVANIA
125
115
105
95
85
120
110
100
8"
Length of 8" pipe — 730 ft
Average depth of cut — 9.2 ft
Length of 8" pipe — 1655 ft
Average depth of cut — 6.9 ft
GENEVA ROAD
ELM ST
WESTERN
OAK ST
MAPLE ST
AVENUE
LINDEN ST
LINDEN ST
Length of 8" pipe — 2310 ft
Average depth of cut — 12.1 ft

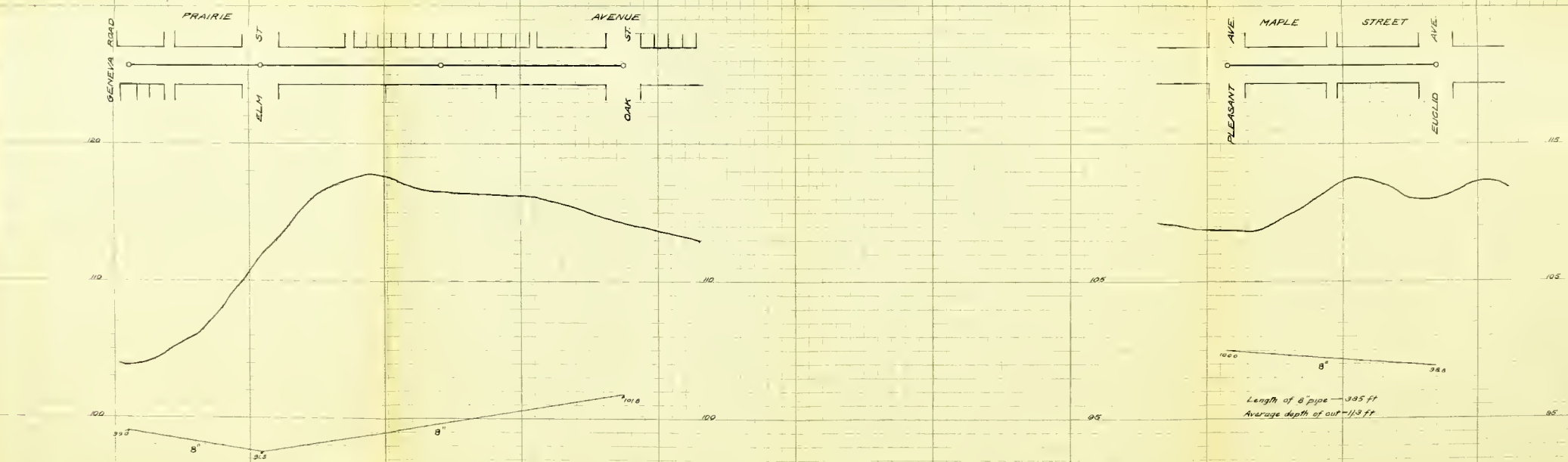

EUCLID ST
ST
ST
ST
AVENUE
ST
ELM
OAK
MAPLE
LINDEN
HAWTHORNE
115
105
95
85
108.0
98.8
90.0
8"
8"
8"
8"
Length of 8" pipe — 2680 ft
Average depth of cut — 11.4 ft

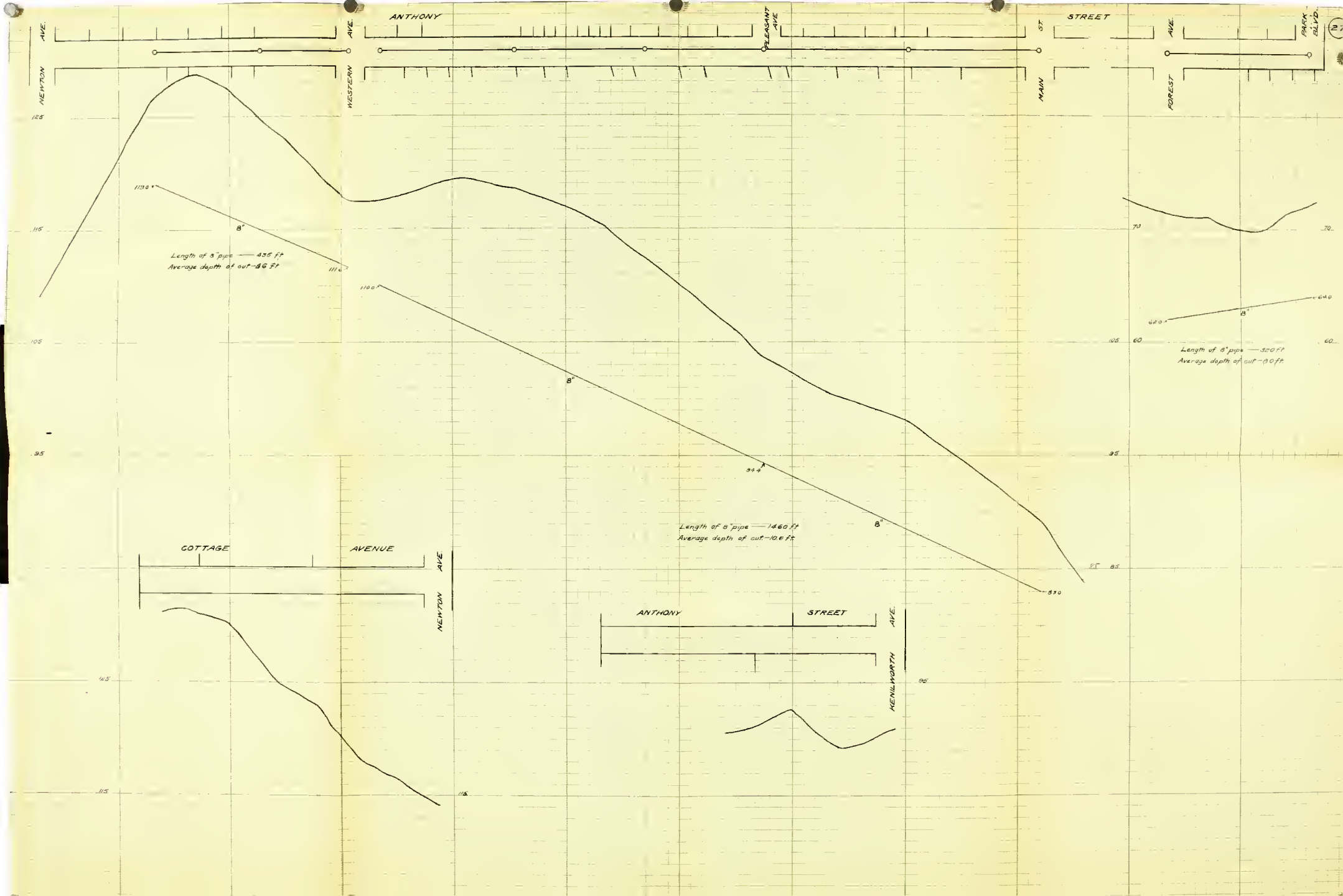

HIGHLAND ST
ST
ST
AVENUE
ST
ELM
OAK
MAPLE
LINDEN
110
100
90
102.0
96.0
96.0
66.0
8"
8"
8"
Length of 8" pipe — 615 ft
Average depth of cut — 11.4 ft
Length of 8" pipe — 1280 ft
Average depth of cut — 15.1 ft

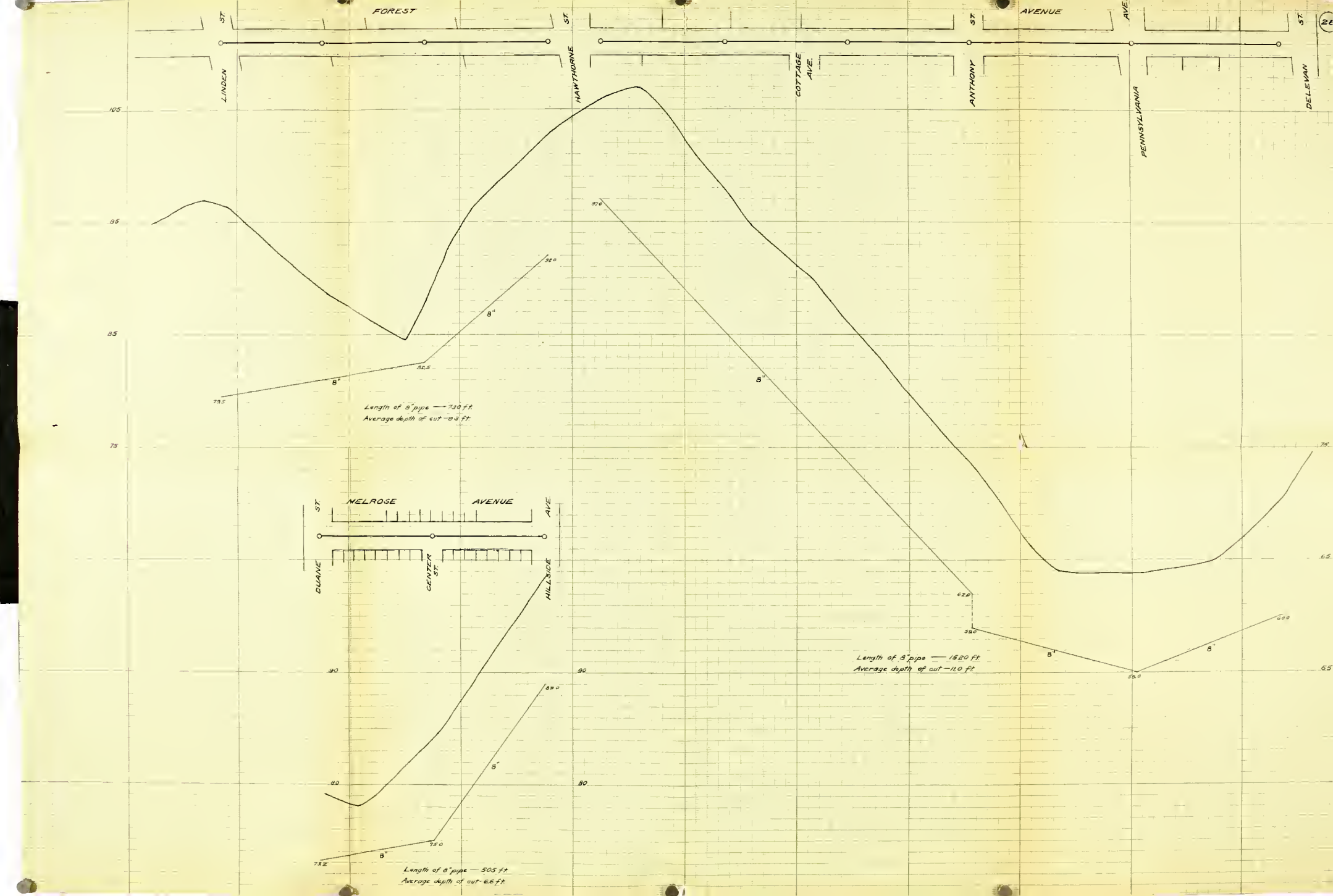

PLEASANT
AVENUE
ST.
OAK
MAPLE
LINDEN
HAWTHORNE
COTTAGE
AVE
115
105
95
100.0
8"
Length of 8" pipe — 2035 ft
Average depth of cut — 9.6 ft
108.0
Length of 8" pipe — 615 ft
Average depth of cut — 8.4 ft

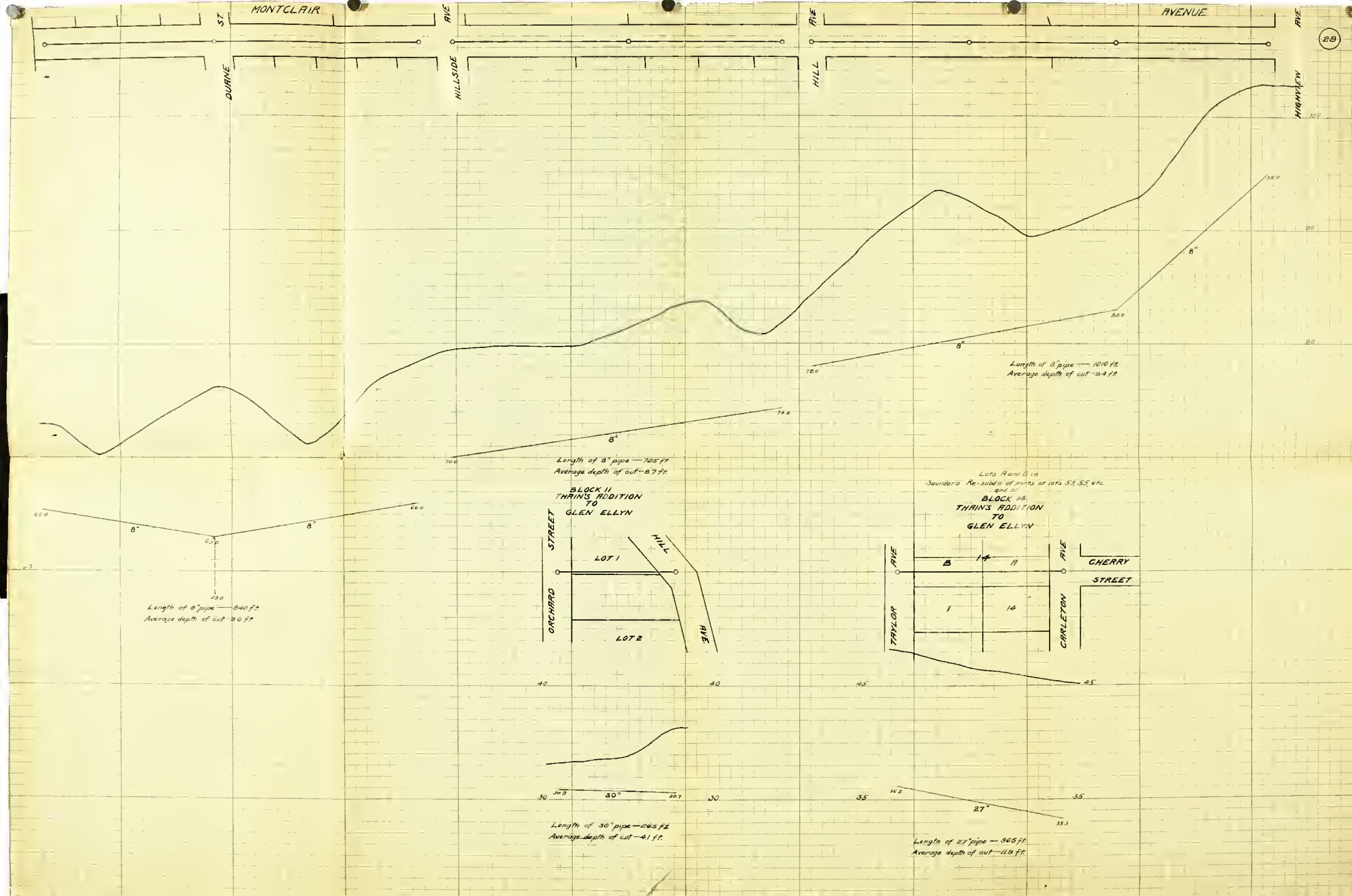

PLEASANT
AVENUE
ST.
ELM
OAK
115
105
108.0
8"
104.0
Length of 8" pipe — 590 ft
Average depth of cut — 7.8 ft
STACY
COURT
110
100
97.0
93.3
90
86.0
Length of 8" pipe — 615 ft
Average depth of cut — 19.6 ft


PRAIRIE
ST.
AVENUE
ST.
OAK
MAPLE
LINDEN
HAWTHORNE
COTTAGE
AVE.
125
115
105
113.6
114.0
110.0
8"
101.8
101.1
Length of 8" pipe — 465 ft.
Average depth of cut — 9.1 ft.
Length of 8" pipe — 2035 ft.
Average depth of cut — 10.2 ft.


PRAIRIE
AVENUE
GENEVA ROAD
ST.
ELM
OAK
MAPLE
STREET
AVE.
PLEASANT
EUCLID
120
115
110
105
100
95
99.0
91.3
101.8
100.0
98.8
8"
Length of 8" pipe — 910 ft.
Average depth of cut — 13.3 ft.
Length of 8" pipe — 385 ft.
Average depth of cut — 11.3 ft.


ANTHONY
STREET
NEWTON AVE.
WESTERN AVE.
PLEASANT AVE
MAIN ST.
FOREST AVE.
PARK BLVD.
125
115
105
95
85
75
65
115
1130
1110
8"
Length of 8" pipe — 435 ft
Average depth of cut — 8.6 ft
1100
8"
944
8"
830
Length of 8" pipe — 1460 ft
Average depth of cut — 10.6 ft
70
60
620
640
8"
Length of 8" pipe — 320 ft
Average depth of cut — 8.0 ft
COTTAGE
AVENUE
NEWTON AVE
ANTHONY
STREET
KENILWORTH AVE.


FOREST
ST.
ST.
ST.
AVENUE
AVE.
ST.
LINDEN
HAWTHORNE
COTTAGE AVE.
ANTHONY
PENNSYLVANIA
DELEVAN
105
95
85
75
90
80
8"
8"
8"
8"
8"
8"
8"
8"
Length of 8" pipe — 730 ft.
Average depth of cut — 8.3 ft.
Length of 8" pipe — 1520 ft.
Average depth of cut — 11.0 ft.
Length of 8" pipe — 505 ft.
Average depth of cut — 6.6 ft.
NELROSE
AVENUE
ST.
AVE.
DUANE
CENTER ST.
HILLSIDE


MONTCLAIR ST
DURANE
HILLSIDE AVE
HILL AVE
AVENUE
HIGHVIEW AVE
100
90
80
8"
780
820
835.0
Length of 8" pipe — 1010 ft.
Average depth of cut — 3.4 ft.
700
754
Length of 8" pipe — 725 ft.
Average depth of cut — 8.7 ft.
654
660
630
580
Length of 8" pipe — 840 ft.
Average depth of cut — 3.0 ft.
BLOCK 11
THRIN'S ADDITION
TO
GLEN ELLYN
STREET
ORCHARD
HILL
AVE
LOT 1
LOT 2
40
Lots A and B in
Saunders Re-subdiv of parts of lots 53, 55, etc.
and of
BLOCK 14
THRIN'S ADDITION
TO
GLEN ELLYN
AVE
TAYLOR
CARLETON
CHERRY
STREET
B
14
A
1
45
30
30.9
30"
30.7
Length of 30" pipe — 265 ft.
Average depth of cut — 4.1 ft.
35
36.2
27"
33.3
Length of 27" pipe — 365 ft.
Average depth of cut — 11.9 ft.